NEW CASTLE COUNTY
VO-TECH SCHOOL DISTRICT

PAUL M. HODGSON
VOCATIONAL TECHNICAL HIGH SCHOOL

2575 Glasgow Avenue, Newark, DE 19702

PROJECT MANUAL

BSA+A PROJECT #22.011

Contract No. NCC2401D

Volume 2
Divisions 03 through 14

BID PACKAGE D – BUILDING ENVELOPE AND FIT OUT
ISSUE FOR BID – ADDENDUM #1

December 28, 2023

ABHA | BSA+A

PROJECT MANUAL

NEW CASTLE COUNTY VO-TECH SCHOOL DISTRICT

PAUL M. HODGSON VOCATIONAL-TECHNICAL HIGH SCHOOL

Contract No. NCC2401D

OWNER
New Castle County Vo-Tech School District
1417 Newport Rd
Wilmington, DE 19804
(302) 995.8000
fax (302) 995.1579

ARCHITECT
ABHA|BSA+A, LLC
1621 North Lincoln St.
Wilmington, DE 19801
(302) 658.6426
(302) 658.9300
Fax (302) 658.8431

CONSTRUCTION MANAGER
EDiS Company
110 South Poplar St., Suite 400
Wilmington, DE 19801
(302) 421.2973

CIVIL ENGINEER
Landmark Science & Engineering
200 Continental Dr., Suite 400
Newark, DE 19713
(302) 323.9377

STRUCTURAL ENGINEER
DCI Engineers
2 Mill Road, Suite 100
Wilmington, DE 19806
(302) 252.9200
Fax (302) 252.9201

MECHANICAL/ELECTRICAL/ PLUMBING ENGINEER
Gipe Associates, Inc.
8719 Brooks Drive
Easton, MD 21601
(410) 822.8688

FOOD SERVICE CONSULTANT
Corsi Associates, LLC
300 Smith St.
Farmingdale, NY 11735
(610) 888.1955

THEATER CONSULTANT
Stages Consultants, LLC
300 Raritan Ave 2nd Floor
Highland Park, NJ 08904
(732) 333.8003

ACOUSTICAL CONSULTANT
Acentech
620 W. Germantown Pike, Suite 210
Plymouth Meeting, PA 19462
(215) 245.8244

SECURITY/TECHNOLOGY CONSULTANT
Educational Systems Planning
2448 Holly Avenue, Suite 302
Annapolis, MD 21401
(410) 573.9148

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December 28, 2023

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DESIGN PROFESSIONALS OF RECORD

Architect
ABHA|BSA+A, LLC
1621 North Lincoln St.
Wilmington, DE 19801
(302) 658.6426
(302) 658.9300

Civil Engineer
Landmark Science & Engineering
200 Continental Dr., Suite 400
Newark, DE 19713
(302) 323.9377

Structural Engineer
DCI Engineers
2 Mill Road, Suite 100
Wilmington, DE 19806
302-252-9200

MEP-FP Engineer
Gipe Associates
8719 Brooks Drive
Easton, MD 21601
(410) 822-8688

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The following previously issued Bid Package documentation is included by reference:
BPB Sitework and Utilities dated 25 May 23
BPB Addendum #1 dated 1 Aug 23
BPB Addendum #2 dated 7 Aug 23
BPB Addendum #3 dated 10 Aug 23
BPC Foundations and Structures 31 Aug 23
BPC Addendum #1 dated 29 Sept 23
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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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies 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.

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 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.

D. Samples: For waterstops and vapor retarder.

E. Welding certificates.

F. Qualification Data: For Installer, manufacturer, testing agency.

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

1. Aggregates.

H. 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. Waterstops.
6. Curing compounds.
7. Floor and slab treatments.
8. Bonding agents.
9. Adhesives.
10. Vapor retarders.
11. Semirigid joint filler.
12. Joint-filler strips.
13. Repair materials.

I. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.

J. Field quality-control test reports.

K. Minutes of preinstallation conference.

1.5 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, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 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 one source, and obtain admixtures through one source from a single manufacturer.

E. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."

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

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

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

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

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.

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, forms and form removal limitations, vapor-retarder installation, steel reinforcement installation, floor and slab flatness and levelness measurement**,** and concrete protection.

1.6 DELIVERY, STORAGE, AND HANDLING

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

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

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

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

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

D. 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.

E. 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.

2.3 STEEL REINFORCEMENT

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

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

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

2.4 REINFORCEMENT ACCESSORIES

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

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

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

2.5 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 C.
   b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Silica Fume: ASTM C 1240, amorphous silica.

C. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.

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

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

2.6 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. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
4. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C. Provide at exterior concrete slabs.

1. Products:

a. Boral Material Technologies, Inc.; Boral BCN.
b. Euclid Chemical Company (The); Eucon CIA.
c. Grace Construction Products, W. R. Grace & Co.; DCI.
d. Master Builders, Inc.; Rheocrete CNI.
e. Sika Corporation; Sika CNI.

D. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete. Provide at exterior concrete slabs.

1. Products:

a. Axim Concrete Technologies; Catexol 1000CI.
b. Boral Material Technologies, Inc.; Boral BCN2.
c. Grace Construction Products, W. R. Grace & Co.; DCI-S.
d. Master Builders, Inc.; Rheocrete 222+.
e. Sika Corporation; FerroGard-901.

E. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.

1. Manufacturers:

a. Bayer Corporation.
b. ChemMasters.
c. Conspec Marketing & Manufacturing Co., Inc.; a Dayton Superior Company.
d. Davis Colors.
e. Elementis Pigments, Inc.
f. Hoover Color Corporation.
g. Lambert Corporation.
h. Scofield, L. M. Company.

i. Solomon Colors.

2. Color: As selected by Architect from manufacturer's full range.

2.7 WATERSTOPS

A. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch (19 by 25 mm).

1. Products:

a. Colloid Environmental Technologies Company; Volclay Waterstop-RX.
b. Approved equal

2.8 VAPOR RETARDERS

A. Plastic Vapor Retarder: ASTM E 1745, Class C**,** or polyethylene sheet, ASTM D 4397, not less than 15 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive joint tape.

1. Products:
a. Stego Industries, LLC; Stego Wrap, 15 mils.

B. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

2.9 FLOOR AND SLAB TREATMENTS

A. Penetrating Liquid Floor Treatment: Provide at all exposed concrete surfaces to be treated to harden, seal and densify exposed concrete. Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.

1. Products:
a. Dayton Superior Corporation; Day-Chem Sure Hard.
b. Euclid Chemical Company (The); Euco Diamond Hard.
c. L&M Construction Chemicals, Inc.; Seal Hard.
d. Meadows, W. R., Inc.; Liqui-Hard.

B. Stained Hardener with matching cure/sealer - Pigmented Mineral Dry-Shake Floor Hardener: Factory-packaged, dry combination of portland cement, graded quartz aggregate, color pigments, and plasticizing admixture. Use color pigments that are finely ground, nonfading mineral oxides interground with cement. Placing of hardener is followed by manufacturer’s recommended water membrane-forming cure and seal: ASTM C 309

1. Products:

a. L&M Construction Chemicals, Inc.; Quartz Plate FF Hardener followed by Dress & Seal WB 30 per manufacturer's recommendations and specifications.
b. Scofield, L. M. Company; Lithochrome Color Hardener followed by Lithochrome Colorwax in matching color per manufacturer's recommendations and specifications.

2.10 CURING MATERIALS

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

1. Products:
   a. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Aquafilm.
   b. Dayton Superior Corporation; Sure Film.
   c. Euclid Chemical Company (The); Eucobar.
   d. L&M Construction Chemicals, Inc.; E-Con.
   e. Meadows, W. R., Inc.; Sealtight Evapre.
   f. Sika Corporation, Inc.; SikaFilm.

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:
   a. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
   b. Euclid Chemical Company (The); Kurez DR VOX.
   c. L&M Construction Chemicals, Inc.; L&M Cure R.
   d. Meadows, W. R., Inc.; 1100 Clear.
   e. Tamms Industries, Inc.; Horncure WB 30.

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

C. Reglets: Fabricate reglets of not less than 0.0217-inch- (0.55-mm-) thick, galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

D. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.12 REPAIR MATERIALS

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

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

B. Repair Overlayment: 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 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.

2.13 CONCRETE MIXTURES, GENERAL

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

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

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
1. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
2. Silica Fume: 10 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement at exterior conditions and 0.30 percent by weight of cement at interior conditions.

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

1. Use 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.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

E. 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. Coordinate color and location with Architect.

2.14 CONCRETE MIXTURES FOR BUILDING ELEMENTS

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

1. Minimum Compressive Strength: 4500 psi (31.0 MPa) at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.50.
3. Slump Limit: 3 inch minimum and 5 inch maximum (at point of concrete placement), plus or minus 1 inch (25 mm).
4. Exposure Class: F2, S0, C1, P0

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

1. Minimum Compressive Strength: 4500 psi (31.0 MPa) at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.50.
3. Slump Limit: 3 inch minimum and 5 inch maximum (at point of concrete placement), plus or minus 1 inch (25 mm).
4. Exposure Class: F2, S0, C1, P0

C. Slabs-on-Grade - Interior: 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: 3 inch minimum and 5 inch maximum (at point of concrete placement), plus or minus 1 inch (25 mm).
4. Exposure Class: F0, S0, C1, P0

D. Slabs-on-Grade – Exterior (Exposed to Exterior Conditions): Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4500 psi (31 MPa) at 28 days.
2. Minimum Cementitious Materials Content: 520 lb/cu. yd. (309 kg/cu. m).
3. Slump Limit: 3 inch minimum and 5 inch maximum (at point of concrete placement), plus or minus 1 inch (25 mm).

4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch (25-mm) nominal maximum aggregate size.
5. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
6. Exposure Class: F2, S0, C2, P0

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

1. Minimum Compressive Strength: 3500 psi (24.1 MPa) at 28 days.
2. Minimum Cementitious Materials Content: 470 lb/cu. yd. (309 kg/cu. m).
3. Slump Limit: 3 inch minimum and 5 inch maximum (at point of concrete placement), plus or minus 1 inch (25 mm). For pumpable concrete, slumps may be increased by 3 inches.
4. Exposure Class: F0, S0, C0, P0

2.15 FABRICATING REINFORCEMENT

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

2.16 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and 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 347R as abrupt or gradual, as follows:

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

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

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

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

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

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

H. 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, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are 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. Plastic Vapor Retarders: Place, protect, and repair vapor retarders 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 vapor retarders according to manufacturer's written instructions.

C. Granular Course: Cover vapor retarder with granular fill, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch (0 mm) or minus 3/4 inch (19 mm).

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, where indicated.

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

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

3.7 JOINTS

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

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

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
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 Division 7 Section "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

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

3.8 WATERSTOPS

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

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

3.9 CONCRETE PLACEMENT

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

B. 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.

3.10 FINISHING FORMED SURFACES

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

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

B. 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 be covered with a coating or covering material applied directly to concrete.

C. 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.

3.11 FINISHING FLOORS AND SLABS

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

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

1. Apply scratch finish to surfaces indicated and to receive concrete floor toppings.

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, 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 and per ACI 117 "Specification For Tolerances For Concrete Construction & Materials":

    a. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 25 as a minimum. Coordinate and specify minimum F(F) and F(L) values with flooring manufacturer during concrete pre-installation conference. Note: Flooring manufacturer may require very flat surface classification (F(F) 45; F(L) 35) or super flat surface classification (F(F) 60 ; F(L) 40). Coordinate locations and requirements prior to installation.

    b. Provide maximum floor variation of 1/8" in 10' and 1/16" in 1' for terrazzo floor tile area or requirement as indicated by product manufacturer, whichever is more stringent.

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and 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.

3.12 MISCELLANEOUS CONCRETE ITEMS

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

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

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

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.

3.13 CONCRETE PROTECTING AND CURING

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

B. Evaporation Retarder: 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. 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.

3.14 JOINT FILLING

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

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

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

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

3.15 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 in solid concrete, but not less than 1 inch (25 mm) in depth. 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, pop-outs, 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.

3.16 FIELD QUALITY CONTROL

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

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; 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 does not comply with the Contract Documents.

E. Measure floor and slab flatness and levelness according to ASTM E 1155 (ASTM E 1155M) within 48 hours of finishing. Values to be documented and provided to Architect and Flooring Manufacturer prior to placing flooring.

END OF SECTION

SECTION 04 20 00
UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Concrete block.
- B. Split-face concrete block.
- C. Ground-face concrete block.
- D. Clay facing brick.
- E. Mortar and grout.
- F. Reinforcement and anchorage.
- G. Lintels.
- H. Accessories.

1.02 RELATED REQUIREMENTS
- A. Division 1 - Administrative Requirements: Preconstruction meeting.
- B. Section 04 43 13 - Stone Masonry Veneer: Stone Veneer at base of Calcium Silicate Masonry.
- C. Section 05 50 00 - Metal Fabrications: Loose steel lintels.
- D. Section 07 11 13 - Bituminous Dampproofing: Dampproofing masonry surfaces.
- E. Section 07 13 00 - Sheet Waterproofing: Waterproofing masonry surfaces.
- F. Section 07 21 00 - Thermal Insulation: Insulation for cavity spaces.
- G. Section 07 26 40 - Spray Polyurethane Foam Insulating Air Barrier
- H. Section 07 62 00 - Sheet Metal Flashing and Trim: Through-wall masonry flashings.
- I. Section 07 84 00 - Firestopping: Firestopping at penetrations of fire-rated masonry and at top of fire-rated walls.
- J. Section 07 92 00 - Joint Sealants: Sealing control and expansion joints.

1.03 PRICE AND PAYMENT PROCEDURES
- A. See Section 01 23 00 - Alternates, for alternates affecting the work of this section.

1.04 REFERENCE STANDARDS
- A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2022, with Errata.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2023.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.
- D. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2022.
- E. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units 2022.
- F. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units 2023.
- G. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar 2018.
- H. ASTM C150/C150M - Standard Specification for Portland Cement 2022.
- I. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes 2018.
- J. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale) 2023.

K. ASTM C270 - Standard Specification for Mortar for Unit Masonry 2019a, with Editorial Revision.
L. ASTM C404 - Standard Specification for Aggregates for Masonry Grout 2018.
M. ASTM C476 - Standard Specification for Grout for Masonry 2023.
N. ASTM C780 - Standard Test Methods for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry 2023.
O. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete 2016.
P. ASTM C1072 - Standard Test Methods for Measurement of Masonry Flexural Bond Strength 2022.
Q. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms 2023a.
R. ASTM E514/E514M - Standard Test Method for Water Penetration and Leakage Through Masonry 2020.
S. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing 2017.
T. BIA Technical Notes No. 13 - Ceramic Glazed Brick Exterior Walls 2017.
U. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures 2022, with Errata.
V. UL (FRD) - Fire Resistance Directory Current Edition.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting two weeks before starting work of this section; require attendance by all relevant installers.
B. Refer to Section 01 3000 - Administrative Requirements for additional information.

1.06 SUBMITTALS

A. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, masonry accessories, and cleaning products including application .
B. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, and accessories for special shapes.
C. Samples: Submit two samples of decorative block and facing brick units to illustrate color, texture, and extremes of color range.
D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements, including referenced material standards and fire ratings.
E. Shop Drawings: Provide shop drawings of vertical wall reinforcement and bond beam reinforcement. Submit, with copies to the Owner’s Independent Testing and Inspection Agency, shop drawings for reinforcing detailing fabrication, bending, and placement of unit masonry reinforcing bars. Show details of construction, including dimensioned drawings, plans, elevations, sections, and details of components to be incorporated into Work including, but not limited to, the following:
    1. Flashing System: Large-scale details for each element of flashing system showing layout, profiles, methods of joining, and anchorage details; including lintel units, shelf units, corner units, end dam units, drip edges, conditions showing interface and relationship to adjacent materials, and other special applications.
    2. Fabricated Flashing: Detail corner units, end-dam units, drip edges, and other special applications.
    3. Anchors, Ties, and Accessories: Show sizes, coursing, and locations.
    4. Reinforcing: For masonry reinforcing bars; comply with ACI 315, "Details and Detailing of Concrete Reinforcement"showing bar schedules, stirrup spacing, diagrams of bent bars,

and arrangement of masonry reinforcement. Show elevations of reinforced walls.

1.07 INFORMATIONAL SUBMITTALS

A. Material Test Reports: For each type of masonry unit, cementitious materials, and accessories required. Include data on material propertiesmaterial test reports substantiating compliance with requirements. For brick, include test report for efflorescence according to ASTM C 67.
   1. Provide test reports based on testing within previous two years.

B. Material Certificates: Submit material certificates for the following, signed by manufacturer and Contractor. Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards.
   1. Each type of masonry unit.
   2. Cementitious materials. Include brand, type, and name of manufacturer. Provide certifications from manufacturer that no admixtures have been added to cementitious materials.
   3. Grout mixes. Include description of type and proportions of ingredients.
   4. Each material and grade indicated for reinforcing bars.
   5. Each type and size of joint reinforcement.
   6. Each type and size of anchors, ties, and metal accessory.

C. Mix Designs: Submit material test reports for the Owner’s Independent Testing and Inspection Agency, indicating and interpreting test results relative to compliance of the following proposed masonry materials with requirements.
   1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content. Include description of type and proportions of mortar ingredients.
   2. Include test reports, according to ASTM C 1019 for grout mixes required to comply with compressive strength requirement. Include description of type and proportions of grout ingredients.

D. 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.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Pre-Faced Units: 50 of each type, size, and color combination.

1.08 QUALITY ASSURANCE

A. Installer Qualifications: The unit masonry work to be by a single firm specializing in exterior wall masonry work, for a period of not less than 5 years, so that there will be undivided responsibility in this single firm for such work.
   1. The Installer must be experienced with work comparable to the work shown and specified and who has completed projects with a successful in-service performance for a period of not less than 5 years.
   2. The Installer shall engage experienced and qualified subcontractors to perform any part of the masonry work which he is not equipped or qualified to perform properly with his own forces.

B. Standards: Comply with the applicable provisions and recommendations of the following standards below, where standards conflict, the more stringent shall apply, and where a conflict between any stated standard and a project specific requirement of the specifications arise, the more stringent provision shall prevail.

1. National Concrete Masonry Association (NCMA):"TEK" Information Series.
2. American Concrete Institute (ACI):
   a. ACI 530/ASCE 5/TMS 402: "Building Code Requirements for Masonry Structures."
   b. ACI 530.1/ASCE 6/TMS 602: "Specifications for Masonry Structures."
3. Brick Industry Association (BIA) "Technical Notes on Brick Construction."
4. Underwriters Laboratories, Inc. (UL) "Fire Resistance Ratings."
5. American Society for Testing and Materials (ASTM) E 2266 “Standard Guide for Design and Construction of Low-Rise FrameBuilding Wall Systems to Resist Water Intrusion.”

C. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, through one source from a single manufacturer for each product required.

D. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.

E. Owner’s Independent Testing and Inspection Agency: The Owner will engage a qualified independent testing and inspection agency to perform preconstruction testing indicated below for field quality control. Payment for these services will be made by Owner. Independent testing agency to coordinate submittal of "Special Inspections" testing documentation for State of Delaware (State) review and approval.
   1. The Contractor is responsible for the expense of testing or inspection resulting as a consequence of the following:
      a. Work not evidencing compliance with this specification.
      b. Testing to verify the adequacy of work done without prior notice, improper supervision, or contrary to standard construction practice.
   2. Contractor's Responsibilities:
      a. Furnish labor required to facilitate testing.
      b. Provide materials, samples and access to materials as required for testing.
      c. Provide a complete set of shop and erection drawings, including revisions to previous Architect reviewed submittals.
   3. Owner’s Independent Testing and Inspection Agency's Duties:
      a. The Owner’s Independent Testing and Inspection Agency shall conduct the following tests and inspections, interpret them, evaluate the results for compliance with the specifications, and report the findings to the Architect, Owner, Contractor, and Local Building Authority, as their interests may appear.
         1) Inspection and testing shall be in accordance with ACI requirements for masonry (ACI 530 and ACI 503.1) for the following inspections:
            (a) Observation, sampling and placing of masonry units used in all reinforced masonry construction.
            (b) Inspection reports during reinforced masonry erection.
            (c) Observations of reinforcement condition, size and placement for compliance with ACI 530.
            (d) Ambient temperature during reinforced masonry erection.
            (e) Inspection of reinforced masonry materials to verify compliance with ACI 530.1.
            (f) Prism testing of masonry.
            (g) Observation of proportioning, mixing, consistency of mortar and grout for compliance with ACI 530.1.
            (h) Observation of application of mortar, grout and masonry units for compliance with ACI 530.1.
            (i) Observation of installation of anchors for compliance with ACI 530.

b. Tests shall be conducted at the start of the job, using materials and mixes sampled at point of deposit.
c. Testing of Mortar: The Owner's Independent Testing Laboratory shall verify mix consistency by daily testing in accordance with ASTM C780. Test shall establish specific and overall performance characteristics of the mortar system. Test reports shall be submitted to the Owner / Architect for review under the provisions of the Division 01 section under "General Requirements".
d. Test of grout for reinforced masonry for compliance with ASTM C 476 requirements for the types specified and strength shown, conduct and report the following:
   1) Compressive strength (ASTM C 1019); lab cure and break at a time increment of one at 7 days, and two at 28 days; a minimum of 1 field test shall be made for each 5000 square feet of reinforced CMU wall. Make no less than 3 tests.
e. Preliminary Test of Concrete Masonry Design Strength: With sufficient time, and not less than 28 days prior to the start of reinforced masonry construction, test for the compressive concrete masonry design strength (f'm) as specified. The value of f'm shall be determined by tests of masonry assemblies (prisms) in accordance with ACI 530.1. Not less than five prisms shall be taken as 8 inches for reinforced CMU.
f. Field Tests of Concrete Masonry Design Strength: During construction, the value of the compressive concrete masonry design strength (f'm) shall be verified by field tests in accordance with the ACI and ASTM standards. A minimum of one field test shall be made for every 5000 square feet of reinforced CMU wall. Not less than three prisms shall be made for each field test. The thickness of the prisms shall be taken as 8 inches for the reinforced CMU.

F. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire-resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

1.09 MOCK-UPS

A. Construct exterior wall assembly mockup. Include:
   1. Mortar and accessories.
   2. Structural backup, including sheathing.
   3. Flashings (with lap joint, corner, and end dam) .
   4. Spray foam wall insulation.
   5. Control joint
   6. Sample window units with sill unit.
   7. Metal panel system with coping.
B. Mockup shall include corner and return wall.
C. Refer to Section 01 40 00 - Quality Requirements for additional information.
D. Locate where directed.
E. Mock-up may remain as part of work.
F. Refer to Drawings for mockup configurations

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.
B. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

1. Deliver masonry veneer units to the jobsite on covered banded pallets with cardboard between layers. Store pallets in single stacks on level ground and cover with waterproof covering to protect the units form inclement weather. Handle masonry veneer units carefully to avoid breakage and damage to the finished surfaces.

C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

D. Store aggregates where grading and other required characteristics can be maintained and contamination avoided. During cold weather stockpile aggregates so that it may be possible to heat them for use in mixing mortar in compliance with ACI recommendations for cold weather masonry practices.

E. Deliver pre-blended dry mortar mix, if used for the project, in moisture-resistant containers designed for use with dispensing silos. Store pre-blended dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

F. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil. Do not use metal reinforcing or ties having loose rust or other coatings, including ice, that will reduce rust or destroy bond.

1.11 PROJECT CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress. Prevent excess moisture from entering work in progress.
   1. Extend cover a minimum of 24 inches (600 mm) down both sides and hold cover securely in place.
   2. Protect door and window frames and exposed metal flashings from damage.

B. Stain Prevention: Prevent mortar and soil from staining the face of masonry to be left exposed. Immediately remove mortar and soil that come in contact with such masonry.
   1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
   2. Protect sills, ledges, and projections from mortar droppings.
   3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
   4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

C. Cold-Weather Requirements: Do not use metal reinforcing or ties having loose rust or other coatings that will reduce or destroy bond. Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6 and ACI 530/ASCE 5 and the following requirements:
   1. If air temperature falls below 40 deg F, mixing water shall be heated.
   2. If the air temperature falls between 20 deg F and 32 deg F inclusively, sand and water shall be heated.
   3. If the air temperature falls below 20 deg F, in addition to the requirements of the preceding sub-paragraph, masonry units shall be heated, and heated enclosures shall be used with a minimum temperature of 40 deg F.
   4. Masonry shall be protected from freezing for 24 hours after laying.

D. Hot-Weather Requirements: When ambient temperature exceeds 100 deg F (38 deg C), or 90 deg F (32 deg C) with a wind velocity greater than 8 mph (13 km/h), do not spread mortar beds more than 48 inches (1200 mm) ahead of masonry. Set masonry units within one minute of spreading mortar. Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1.12 DEFINITIONS

A. Exterior: Areas exposed to the elements and areas located in unconditioned spaces
B. Interior: Areas located in conditioned spaces

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 depths as indicated on drawings for specific locations.
   2. Special Shapes: Provide non-standard blocks configured for corners, lintels, control joint edges, jambs, sash, and other detailed conditions.
   3. Load-Bearing Units: ASTM C90, lightweight.
      a. Hollow block, as indicated.
B. Decorative Concrete Masonry Units
   1. Ground Face and Split Face Block: ASTM C 90:
      a. Size:
         1) Size: Standard units with nominal face dimensions of 16 x 8 inches (400 x 200 mm) and nominal depths as indicated on the drawings for specific locations.
      b. Pattern and Texture:
         1) Pattern: ground face and split face finish; ground face units sealed.
      c. Color: To be selected from full range of manufacturer's standard colors.
         1) Ground Face Type 1: York Building Products, Gemstone "Ash."
         2) Ground Face Type 2: York Building Products, Gemstone "Flint."
         3) Split Face Type 1: n/a
         4) Split Face Type 2: York Building Products, Split Face "Flint."
   2. Shapes: Provide special shapes indicated, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated. Special shapes include but are not limited to:
      a. Corner units
      b. Sill units
      c. Water table units
   3. Manufacturers:
      a. Basis of Design Ground Face Product: York Building Products, Gemstone: www.yorkbuilding.com.
         1) Subject to compliance with requirements, products by the following manufacturers are also acceptable:
            (a) Echelon Trenwyth Trendstone: www.echelonmasonry.com.
            (b) Nitterhouse Masonry Products, Architectural Masonry Ground Face: www.nitterhousemasonry.com.
            (c) Fizzano Brothers; Groundface: www.fizzano.com
      b. Basis of Design Split Face Product: York Building Products, Split Face: www.yorkbuilding.com.
         1) Subject to compliance with requirements, products by the following manufacturers are also acceptable:

(a) Nitterhouse Masonry Products, Architectural Masonry Split Face: www.nitterhousemasonry.com.
(b) Echelon Split Face: www.echelonmasonry.com.
(c) Fizzano Brothers; Split Face: www.fizzano.com

c. Substitutions: See Section 01 60 00 - Product Requirements.

C. Units with Integral Water Repellent: Provide exterior concrete block units as specified in this section with polymeric liquid admixture added to concrete masonry units at the time of manufacture.
1. Performance of Units with Integral Water Repellent:
a. Water Permeance: When tested per ASTM E514/E514M and for a minimum of 72 hours.
1) No water visible on back of wall above flashing at the end of 24 hours.
2) No flow of water from flashing equal to or greater than 0.032 gallons per hour (0.05 L per hour) at the end of 24 hours.
3) No more than 25 percent of wall area above flashing visibly damp at end of test.
b. Flexural Bond Strength: ASTM C1072; minimum 10 percent increase.
c. Compressive Strength: ASTM C1314; maximum 5 percent decrease.
2. Use only in combination with mortar that also has integral water repellent admixture.
3. Use water repellent admixtures for masonry units and mortar by a single manufacturer.

2.02 BRICK UNITS

A. Facing Brick: ASTM C216, Type FBS and FBX (as noted), Grade SW.
1. Basis of Design Manufacturer: Glen Gery, Sioux City Brick: www.glengery.com.
a. Color A: Granite Red Smooth Ironspot
1) Actual size: 15-5/8" long x 3-5/8" high, x 3-5/8" deep.
2) Provide Type FBX units.
b. Color B: Blue Ironspot Smooth
1) Actual size: 7-5/8" long x 2-1/4" high, x 3-5/8" deep.
2) Provide Type FBS units.
2. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect:
a. Corner brick units (custom angle).
b. Soldier course units with solid corners.
c. Soldier course inits with chamfered face.
3. Other approved manufacturers, subject to compliance with requirements:
a. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 MORTAR AND GROUT MATERIALS

A. Masonry Cement: not permitted.
B. Portland Cement: ASTM C150/C150M, Type Ior Type II, without air entrainment.
C. Hydrated Lime: ASTM C207, Type S.
D. Mortar Aggregate: ASTM C144: sand.
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. Basis of Design mortar color: Work-Rite WR-2062 Smoke.
G. Water: Clean and potable.
H. Accelerating Admixture: Not permitted.
I. Integral Water Repellent Admixture for Mortar: Polymeric liquid admixture added to mortar at the time of manufacture.

1. Use only in combination with concrete masonry units manufactured with integral water repellent admixture.
2. Use only water repellent admixture for mortar from the same manufacturer as water repellent admixture in masonry units.
3. Meet or exceed performance specified for water repellent admixture used in masonry units.
    a. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Dry-Block Mortar Admixture.
    b. Master Builders, Inc.; Rheopel
    c. Amerimix, an Oldcastle brand; AMX 410: www.amerimix.com.

2.04 REINFORCEMENT AND ANCHORAGE

A. Manufacturers:
    1. Blok-Lok Limited: www.blok-lok.com.
    2. Hohmann & Barnard, Inc (including Dur-O-Wal brand): www.h-b.com.
    3. WIRE-BONDwww.wirebond.com/#sle.
B. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa), deformed billet bars; uncoated.
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: Truss or ladder type; ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M, Class B; 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure. . Provide in lengths of not less than 10 feet (3 m),with prefabricated corner and tee units.
E. Multiple Wythe Joint Reinforcement: Truss type; fabricated with moisture drip; ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/153M, Class B; 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure. Provide in lengths of not less than 10 feet (3 m),with prefabricated corner and tee units.
F. Adjustable Multiple Wythe Joint Reinforcement: Truss type with adjustable ties spaced at 16 in (406 mm) on center ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/153M, Class B; 0.1483 inch (3.8 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 more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage from each masonry face. Provide in lengths of not less than 10 feet (3 m),with prefabricated corner and tee units.
    1. Vertical adjustment: Not less than 3-1/2 inches (89 mm).
G. 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.
    1. Steel frame: Crimped wire anchors for welding to frame, 0.25 inch (6.3 mm) thick, with trapezoidal wire ties 0.1875 inch (4.75 mm) thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
    2. Firewall break-away ties, steel to masonry: Provide break-away/melt-away connectors manufactured with metals having melting points lower than structural steel (800°F

[427°C]).

H. Two-Piece Wall Ties: Formed steel wire, 0.1875 inch (4.8 mm) thick, adjustable, eye and pintle type, stainless steel, sized to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage from masonry face and to allow vertical adjustment of up to 1-1/4 in (32 mm).

I. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, Stainless Steel Wire: ASTM A 580/A 580M, AISI Type 304 and / or Stainless Steel Sheet: ASTM A 167, A 240, or A 666, AISI Type 316..
   1. Anchor plates: Not less than .093 inch (2.3 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. Pintles: Trapezoidal, or rectangular shape shape, 0.1875 inch (4.75 mm) thick.
   3. Vertical adjustment: Not less than 2 inches (50 mm).
   4. Manufacturers:
      a. HB-200-X anchor by Hohmann & Barnard, Inc.(/www.h-b.com)
   5. Stacked bond: Provide lip, hook, or clip on end of wire ties to engage or enclose not less than one continuous horizontal joint reinforcement wire of 0.1483 inch (3.8 mm) diameter.

2.05 FLASHINGS

A. See Section 07 62 00 - Sheet Metal Flashing and Trim .

2.06 ACCESSORIES

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

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

C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, duel level, trapezoidal shape and designed to prevent mortar droppings from clogging cavity weeps and allow proper cavity drainage.
   1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
      a. Manufacturers:
         1) Mortar Net Solutions; MortarNet with Insect Barrier: www.mortarnet.com.
      b. Locations: At flashing locations in brick veneer walls.

D. Cavity Weeps : Polyester mesh.

E. Color(s): As selected by Architect from manufacturer's full range.

F. Steel Shelf Angles and Lintels: galvanized, see Section 05 12 00 - Structural Steel Framing and Section 05 50 00 - Metal Fabrications.

G. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142inch (3.6mm) steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated.

2.07 MORTAR AND GROUT MIXES

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 S.
   3. Exterior, non-loadbearing masonry: Type N.
   4. Interior, loadbearing masonry: Type S.
   5. Interior, non-loadbearing masonry: Type N.

B. Mortar Type S: minimum 1800 psi, ASTM C 270.

C. Mortar Type N: One (1) part Portland Cement, one (1) part hydrated lime, and six (6) parts sand.
D. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
E. 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). Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 of ACI 530.1/ASCE 6/TMS 602 and ACI 530/ASCE 5 for dimensions of grout spaces and pour height. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.
F. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.
G. Mixing: Use mechanical batch mixer and comply with referenced standards.

2.08 SOURCE QUALITY CONTROL

A. Owner may engage a qualified independent testing agency to perform source quality-control testing indicated below. Payment for these services will be made by Owner.
B. Brick Tests: For each type and grade of brick indicated, units will be tested according to ASTM C 67.
C. Concrete Masonry Unit Tests: For each type of concrete masonry unit indicated, units will be tested according to ASTM C 140.

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 INSTALLATION - GENERAL

A. Comply with ACI 530.1/ASCE 6, ACI 530/ASCE 5, and other requirements indicated applicable to each type of installation included in Project.
B. Use full size units without cutting, if possible.
    1. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges.
    2. Allow units to dry before laying unless wetting of units is specified.
    3. Install cut units with cut surfaces and, where possible, cut edges concealed.
C. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
    1. Mix units from several pallets as they are placed.
D. Wetting of Brick:
    1. Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67.

2. Allow units to absorb water so they are damp but not wet at time of laying.

E. Cover tops of all partially completed walls at end of day to protect completed work and prevent water from entering the cavity.

F. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.04 COLD AND HOT WEATHER REQUIREMENTS

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

3.05 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 and stack bond, as indicated.
2. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).
3. Mortar Joints: Concave.

D. Brick Units:

1. Bond: Stacked.
2. Coursing: Two units and two mortar joints to equal 8 inches (200 mm).
3. Mortar Joints: Concave.

3.06 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.

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, cement parging is required, or resilient base is scheduled. Use square outside corners where wall tile is scheduled or corner guards are shown. Use bullnose outside corners at typical outside CMU corner.

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.

3.07 WEEPS

A. Install weeps in veneer and cavity walls at 16 inches (406 mm) on center horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls.

B. Place weeps directly on flashing.

C. Do not strike mortar across bottom of weep.
   1. If mortar is struck across weep, remove and replace weep.

3.08 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 diverter at base of cavity full width of air space and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.09 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. Lap joint reinforcement ends minimum 6 inches (150 mm).
E. Reinforce joint corners and intersections with strap anchors 16 inches (400 mm) on center.
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 16 inches (400 mm) horizontally and 16 inches (400 mm) vertically.

3.10 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY

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

3.11 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

A. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches (400 mm) on center vertically and 16 inches (400 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 16 inches (400 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.
C. Stacked Bond Reinforcement: Connect veneer anchors with continuous horizontal wire reinforcement before embedding anchors in mortar.

3.12 REINFORCEMENT AND ANCHORAGES - MULTIPLE WYTHE UNIT MASONRY

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

E. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.
F. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 16 inches (400 mm) horizontally and 16 inches (400 mm) vertically.

3.13 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 with a minimum of two beads of continuous sealant from leading edge of horizontal surface across and up entire height of vertical/sloped surface. Seal penetrations of flashing before covering with mortar.
    4. Fold flashing to create end dams at discontinuous ends. Turn up one course.
    5. Seal penetrations of flashing materials at cast stone and other anchors with compatible sealant or mastic.
B. Terminate flashing up 8 inches (203 mm) minimum on vertical surface of backing:
    1. Install vertical leg of flashing behind water-resistive barrier over backing.
    2. Anchor vertical leg of flashing into backing with a termination bar and sealant.
C. Install flashing in accordance with manufacturer's instructions and BIA Technical Notes No. 7.
D. Extend metal flashings flush with the exterior face of masonry. Install flashing in two beads of butyl joint sealer Type 3 below flashing to prevent moisture migration under flashing. Refer to Section 07 92 00 - Joint Sealants.
E. Support flexible flashings across gaps and openings.
F. Lap end joints of metal flashings at least 6 inches (152 mm) and seal watertight with Sealant Type 3.
    1. Refer to Sections 07 62 00 - Sheet Metal Flashing and Trim and 07 92 00 - Joint Sealants.

3.14 LINTELS

A. Refer to structural drawings for lintel requirements.
B. Install loose steel lintels over openings.
C. Maintain minimum 8 inch (200 mm) bearing on each side of opening.

3.15 GROUTED COMPONENTS

A. Reinforce bond beams as noted on the Contract 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.
F. Limit height of vertical grout pours to not more than 60 inches (1520 mm).

3.16 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control or expansion joints.
B. Form control joint with a sheet building paper bond breaker fitted to one side of the hollow contour end of the block unit. Fill the resultant core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.

C. Size control joints 3/8 inch wide and deep.
D. Form expansion joint as detailed on drawings.

3.17 BUILT-IN WORK

A. As work progresses, install built-in metal door frames, window frames, anchor bolts, plates, and louvers 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.

3.18 DAMPPROOFING EXTERIOR SITE WALLS

A. Apply elastomeric coating to CMU core of masonry site landscaping walls prior to finishing with face brick.
B. Follow manufacturer's instructions for application.
C. Achieve required dry film thickness by applying multiple coats of product.

3.19 TOLERANCES

A. Maximum Variation from Alignment of Columns: 1/4 inch (6 mm).
B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (1.6 mm).
C. 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.
D. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.
E. 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).
F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch (minus 6.4 mm, plus 9.5 mm).
G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch (6 mm).

3.20 CUTTING AND FITTING

A. Cut and fit for chases, other items, pipes, other items, conduit, other items, sleeves, other items, grounds, other items, and other items. 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.

3.21 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - 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.

3.22 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.

3.23 PROTECTION

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

SECTION 04 72 00
CAST STONE MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Architectural cast stone.
- B. Units required are:
  1. Exterior wall units, including coping and sills.
  2. Other items indicated on drawings.

1.02 RELATED REQUIREMENTS
- A. Section 04 20 00 - Unit Masonry: Installation of cast stone in conjunction with masonry.
- B. Section 07 92 00 - Joint Sealants: Sealing joints indicated to be left open for sealant.

1.03 REFERENCE STANDARDS
- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2022.
- C. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement 2019.
- D. ASTM A884/A884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement 2019, with Editorial Revision (2020).
- E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2022.
- F. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2023.
- G. ASTM C150/C150M - Standard Specification for Portland Cement 2022.
- H. ASTM C270 - Standard Specification for Mortar for Unit Masonry 2019a, with Editorial Revision.
- I. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete 2019, with Editorial Revision (2022).
- J. ASTM C642 - Standard Test Method for Density, Absorption, and Voids in Hardened Concrete 2021.
- K. ASTM C1364 - Standard Specification for Architectural Cast Stone 2023.

1.04 SUBMITTALS
- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Test results of cast stone components made previously by the manufacturer.
- 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. 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 five 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. Any current producer member of the Cast Stone Institute.

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: Custom color to match sample on file at Architect 's office.
   5. Remove cement film from exposed surfaces before packaging for shipment.

B. Shapes: Provide shapes 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 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, galvanized.
1. Galvanized in accordance with ASTM A767/A767M, Class I.
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. Shelf Angles and Similar Structural Items: Hot-dip galvanized steel per ASTM A123/A123M, of shapes and sizes as required for conditions.
J. Mortar: Portland cement-lime, ASTM C270 Type N; do not use masonry cement.
K. 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.

2.04 SOURCE QUALITY CONTROL

A. Test compressive strength and absorption of specimens selected at random from plant production.
1. Test in accordance with ASTM C642.
2. Select specimens at rate of 3 per 500 cubic feet (3 per 14 cubic m), with a minimum of 3 per production week.
3. Submit reports of tests by independent testing agency, showing compliance with requirements.

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 04 20 00.
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).
   1. Repair with matching touch-up material provided by the manufacturer and in accordance with manufacturer's instructions.
   2. 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.

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 04 72 00

SECTION 05 12 00

STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Structural steel.
2. Grout.

B. Related Sections include the following:

1. Division 1 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Division 5 Section "Steel Deck" for field installation of shear connectors.
3. Division 5 Section "Metal Fabrications" for steel lintels or shelf angles not attached to structural-steel frame miscellaneous steel fabrications and other metal items not defined as structural steel.
4. Division 9 painting Sections for surface preparation and priming requirements.

1.3 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

1.4 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 ASD-service loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using schematic details indicated and AISC's "Manual of Steel Construction, Allowable Stress Design," Part 4

B. Construction: Type 2, simple framing.

1.5 SUBMITTALS

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

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.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.

C. Welding certificates.

D. Qualification Data: For Installer, fabricator, professional engineer, testing agency.

E. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:

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

F. Source quality-control test reports.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD. If the fabricator does not have the AISC certification they can still bid the project but they are responsible to have a third party inspector inspect the fabrication process to ensure they are meeting AISC guidelines.

B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.

C. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P1 or SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."

D. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."

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

1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. AISC's "Seismic Provisions for Structural Steel Buildings" and "Supplement No. 2."
3. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
4. AISC's "Specification for the Design of Steel Hollow Structural Sections."
5. AISC's "Specification for Allowable Stress Design of Single-Angle Members"
6. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

F. Mockups: Build mockups of architecturally exposed structural steel to set quality standards for fabrication and installation.

1. Coordinate finish painting requirements with Division 9 painting Sections.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

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

1.7 DELIVERY, STORAGE, AND HANDLING

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

1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
2. 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.

1.8 COORDINATION

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

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992/A 992M.

B. Channels, Angles, M, S-Shapes: ASTM A 36/A 36M.

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

D. Corrosion-Resisting Structural Steel: ASTM A 588/A 588M, Grade 50 (345).

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

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

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

1. Weight Class: Standard, Extra strong, or Double-extra strong, as indicated.
2. Finish: Black, except where indicated to be galvanized.

H. Medium-Strength Steel Castings: ASTM A 27/A 27M, Grade 65-35 (Grade 450-240), carbon steel.

I. High-Strength Steel Castings: ASTM A 148/A 148M,Grade 80-50 (Grade 550-345), carbon or alloy steel.

J. Welding Electrodes: Comply with AWS requirements.

2.2 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 (ASTM A 563M) heavy hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.

1. Finish: Plain.
2. Direct-Tension Indicators: ASTM F 959, Type 325 (ASTM F 959M, Type 8.8,) compressible-washer type.

a. Finish: Plain

B. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1, Type B.

C. Unheaded Anchor Rods: ASTM F 1554, Grade 36

1. Configuration: Straight or Hooked, as indicated.
2. Nuts: ASTM A 563 (ASTM A 563M) heavy hex carbon steel.
3. Plate Washers: ASTM A 36/A 36M carbon steel.
4. Washers: ASTM F 436 (ASTM F 436M) hardened carbon steel.
5. Finish: Plain

D. 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) hardened carbon steel.
4. Finish: Plain

E. 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) hardened carbon steel.
3. Finish: Plain

F. Eye Bolts and Nuts: ASTM A 108, Grade 1030, cold-finished carbon steel.

G. Sleeve Nuts: ASTM A 108, Grade 1018, cold-finished carbon steel.

2.3 PRIMER

A. Primer: SSPC-Paint 25, Type I, iron oxide, zinc oxide, raw linseed oil, and alkyd.

B. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.

C. Galvanizing Repair Paint: ASTM A 780.

2.4 GROUT

A. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404, Size No. 2. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

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

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design

1. Camber structural-steel members where indicated.
2. Identify high-strength structural steel according to ASTM A 6/ A 6M and maintain markings until structural steel has been erected.
3. Mark and match-mark materials for field assembly.
4. 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.

C. Bolt Holes: Cut, drill, mechanically thermal cut, 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 3, "Power Tool Cleaning."

F. 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 and manufacturer's written instructions.

G. Welded Door Frames: Build up welded door frames attached to structural steel. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk, cross-recessed head machine screws, uniformly spaced not more than 10 inches (250 mm) o.c., unless otherwise indicated.

H. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.

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

2.6 SHOP CONNECTIONS

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

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
3. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.

a. Grind butt welds flush.
b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:

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

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 3, "Power Tool Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 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 inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.

D. Painting: Apply a 1-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).

2.8 GALVANIZING

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

   1. Fill vent holes and grind smooth after galvanizing.
   2. Galvanize lintels and shelf angles attached to structural-steel frame and located in exterior walls.

2.9 SOURCE QUALITY CONTROL

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

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

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

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

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

   1. Liquid Penetrant Inspection: ASTM E 165.

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

E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1 for stud welding and as follows:

1. Bend tests will be performed if visual inspections reveal either a less-than- continuous 360-degree flash or welding repairs to any shear connector.
2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.

PART 3 - EXECUTION

3.1 EXAMINATION

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

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

3.2 PREPARATION

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

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."

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

1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of base plate.
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 base or bearing plate before packing with grout.

4. Promptly pack grout solidly between bearing surfaces and base or bearing 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 and architecturally exposed structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

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

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

E. Splice members only where indicated.

F. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.

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

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

I. 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 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.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

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

4. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.

    a. Grind butt welds flush.
    b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

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

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

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

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

D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1 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 on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.

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

3.6 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 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 and accessories, bearing plates, and abutting structural steel.

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

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

C. Touchup Painting: Cleaning and touchup painting are specified in Division 9 painting Sections.

END OF SECTION

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. This Section includes the following:

1. K-series steel joists.
2. KCS-type K-series steel joists.
3. LH-series steel joists.
4. Long-span steel joists.
5. Joist accessories.

B. Related Sections include the following:

1. Division 03 Section "Cast-in-Place Concrete" for installing bearing plates in concrete.
2. Division 04 Section "Unit Masonry" for installing bearing plates in unit masonry.

1.3 DEFINITIONS

A. SJI "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 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide special joists and connections capable of withstanding design loads indicated.

B. Design special joists to withstand design loads with live load deflections no greater than the following:
1. Roof Joists: Vertical live load deflection of 1/240 of the span.

1.5 SUBMITTALS

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

B. Shop Drawings: Show layout, designation, number, type, location, and spacings of joists. Include joining and anchorage details, bracing, bridging, joist accessories; splice and connection locations and details; and attachments to other construction.

1. Indicate locations and details of bearing plates to be embedded in other construction.
2. Comprehensive engineering analysis of special joists signed and sealed by the qualified professional engineer responsible for its preparation.

C. Welding certificates.

D. Manufacturer Certificates: Signed by manufacturers certifying that joists comply with requirements.

E. Mill Certificates: Signed by bolt manufacturers certifying that bolts comply with requirements.

F. Qualification Data: For manufacturer.

G. Field quality-control test and inspection reports.

H. Research/Evaluation Reports: For joists.

1.6 QUALITY ASSURANCE

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

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

B. SJI Specifications: Comply with standard specifications in SJI's "Specifications" that are applicable to types of joists indicated.

C. Welding: Qualify 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 MATERIALS

A. Steel: Comply with SJI's "Specifications" for web and steel-angle chord members.

B. Steel Bearing Plates: ASTM A 36/A 36M.

C. Carbon-Steel Bolts and Threaded Fasteners: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), carbon-steel, hex-head bolts and threaded fasteners; carbon-steel nuts; and flat, unhardened steel washers.

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. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20, ASTM A 780.

2.2 PRIMERS

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

2.3 K-SERIES STEEL JOISTS

A. Manufacture steel joists of type indicated according to "Standard Specifications 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. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.

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

E. Top-Chord Extensions: Extend top chords of joists a maximum of 1’-6” with SJI's Type S top-chord extensions where indicated, complying with SJI's "Specifications" and meeting Total Allowable Load of 550 lb/ft and Allowable Live Load of 450 lb/ft.

F. Extended Ends: Extend bearing ends of joists with SJI's Type R extended ends where indicated, complying with SJI's "Specifications" and meeting Total Allowable Load of 550 lb/ft and Allowable Live Load of 450 lb/ft.

G. Camber joists according to SJI's "Specifications." or as indicated.

H. 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).

2.4 LONG-SPAN STEEL JOISTS

A. Manufacture steel joists according to "Standard Specifications for Longspan Steel Joists, LH-Series and Deep Longspan Steel Joists, DLH-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members; of joist type and end and top-chord arrangements as follows or as indicated:

1. Joist Type: LH-series steel joists and DLH-series steel joists.
2. End Arrangement: Underslung.
3. Top-Chord Arrangement: Parallel or pitched if indicated.

B. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.

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

D. Camber long-span steel joists according to SJI's "Specifications."

E. 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).

2.5 JOIST ACCESSORIES

A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal 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. Provide additional bridging as indicated on structural drawings.

B. Fabricate steel bearing plates with integral anchorages of sizes and thicknesses indicated. Shop prime paint.

C. Supply 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.

D. Supply miscellaneous accessories, including splice plates and bolts required by joist manufacturer to complete joist installation.

2.6 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by hand-tool cleaning, SSPC-SP 2 or power-tool cleaning, SSPC-SP 3.

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

C. Apply 1 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.

D. Shop priming of joists and joist accessories is specified in Division 09 painting Sections.

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.

1. 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 recommendations, 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 have been applied.

C. Field weld joists to supporting steel bearing plates and framework. 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 independent testing and inspecting agency to inspect field welds and bolted connections and to perform field tests and inspections and prepare test and inspection reports.

B. Field welds will be visually inspected according to AWS D1.1/D1.1M.

C. In addition to visual inspection, field welds will be tested according to AWS D1.1/D1.1M and the following procedures, as applicable:

1. Radiographic Testing: ASTM E 94.
2. Magnetic Particle Inspection: ASTM E 709.
3. Ultrasonic Testing: ASTM E 164.
4. Liquid Penetrant Inspection: ASTM E 165.

D. Bolted connections will be visually inspected.

E. High-strength, field-bolted connections will be tested and verified according to procedures in RCSC's "Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts."

F. Correct deficiencies in Work that test and inspection reports have indicated are not in compliance with specified requirements.

G. Additional testing will be performed to determine compliance of corrected Work with specified requirements.

3.4 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 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, SSPC-SP 2, or power-tool cleaning, SSPC-SP 3.
2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

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

D. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that joists and accessories are without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 05 31 00

STEEL DECK

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. This Section includes the following:

1. Roof deck.
2. Acoustical cellular roof deck.
3. Composite floor deck.

B. Related Sections include the following:

1. Division 03 Section "Cast-in-Place Concrete" for concrete fill.
2. Division 05 Section "Structural Steel" for shop- and field-welded shear connectors.
3. Division 05 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.
4. Division 09 painting Sections for repair painting of primed deck.
5. Division 16 Section "Underfloor Raceways" for preset inserts, activation kits, after set inserts, service fittings, header ducts, and trench header ducts used with cellular floor-deck systems.

1.3 SUBMITTALS

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

B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

C. Product Certificates: For each type of steel deck, signed by product manufacturer.

D. Welding certificates.

E. Field quality-control test and inspection reports.

F. 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.
2. Acoustical roof deck.

3. Acoustical floor deck.

G. Research/Evaluation Reports: For steel deck.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated.

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

C. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: Indicated by design designations of applicable testing and inspecting agency.
2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.

D. 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."

E. Electrical Raceway Units: Provide UL-labeled cellular floor-deck units complying with UL 209 and listed in UL's "Electrical Construction Equipment Directory" for use with standard header ducts and outlets for electrical distribution systems.

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

1.5 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.

1.6 COORDINATION

A. Coordinate installation of sound-absorbing insulation strips in topside ribs of acoustical deck with roofing installation specified in Division 07 to ensure protection of insulation strips against damage from effects of weather and other causes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

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

1. Steel Deck:

a. ASC Profiles, Inc.
b. Canam Steel Corp.;The Canam Manac Group.
c. Consolidated Systems, Inc.
d. DACS, Inc.
e. D-Mac Industries Inc.
f. Epic Metals Corporation.
g. Marlyn Steel Decks, Inc.
h. New Millennium Building Systems, LLC.
i. Nucor Corp.; Vulcraft Division.
j. Roof Deck, Inc.
k. United Steel Deck, Inc.
l. Valley Joist; Division of EBSCO Industries, Inc.
m. Verco Manufacturing Co.
n. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

2.2 ROOF DECK

A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:

1. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 33 minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer.

a. Color: Manufacturer's standard

2. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 zinc coating.
3. Deck Profile: As indicated.
4. Profile Depth: As indicated.

5. Design Uncoated-Steel Thickness: As indicated.
6. Span Condition: Triple span or more.
7. Side Laps: Overlapped.

2.3 ACOUSTICAL ROOF DECK

A. Acoustical Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:

1. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 33 minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer.

   a. Color: Manufacturer's standard
2. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.

   a. Color: Manufacturer's standard
3. Deck Profile: As indicated
4. Cellular Deck Profile: As indicated
5. Profile Depth: As indicated
6. Design Uncoated-Steel Thickness: As indicated
7. Design Uncoated-Steel Thicknesses; Deck Unit/Bottom Plate: As indicated
8. Span Condition: Triple span or more
9. Side Laps: Overlapped
10. Acoustical Perforations: Cellular deck units with manufacturer's standard perforated flat-bottom plate welded to ribbed deck.
11. Sound-Absorbing Insulation: Manufacturer's standard pre-molded roll or strip of glass or mineral fiber.

12. Acoustical Performance: NRC 0.95 for 3” roof deck depth, tested according to ASTM C 423 or as indicated on drawings.

2.4 COMPOSITE FLOOR DECK

A. Composite Steel 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. 30, with the minimum section properties indicated, and with the following:
1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 G60 zinc coating.
2. Profile Depth: As indicated.
3. Design Uncoated-Steel Thickness: As indicated.
4. Span Condition: Triple span or more.

2.5 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.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 12 (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 As indicated.

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, 0.0598 inch (1.52 mm) thick, with factory-punched hole of 3/8-inch (9.5-mm) minimum diameter.

J. 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.

K. Flat Sump Plate: 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.

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

M. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

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.

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, 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 18 inches (450 mm) apart, maximum or as indicated.
3. 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 1/2 of the span or 36 inches (910 mm)], and as follows:

1. Mechanically fasten with self-drilling, No. 12 (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 2 inches (51 mm) minimum.

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

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

G. Sound-Absorbing Insulation: Installation into topside ribs of deck as specified in Division 07

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 (910 mm), and as follows:

1. Mechanically fasten with self-drilling, No. 12 (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

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: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

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 REPAIRS AND 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 Division 09 Section.

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

END OF SECTION

SECTION 05 40 00.00
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. This Section includes the following:

1. Load-bearing wall framing.
2. Exterior non-load-bearing wall framing.
3. Interior non-load-bearing wall framing where indicated on structural drawings
4. Floor joist framing.
5. Roof rafter framing.
6. Ceiling joist framing.
7. Soffit framing.

B. Related Sections include the following:

1. Division 05 Section "Metal Fabrications" for masonry shelf angles and connections.
2. Division 09 Section "Non-Structural Metal Framing" for interior non-load-bearing, metal-stud framing and ceiling-suspension assemblies.
3. Division 09 Section "Gypsum Board Shaft Wall Assemblies" for interior non-load-bearing, metal-stud-framed, shaft-wall assemblies.

1.3 PERFORMANCE REQUIREMENTS

1.4 SUBMITTALS

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

B. Shop Drawings: Provide standard **plans/sections/details** and product data for lightgage components and all lightgage accessories (clip angles, bridging, slide clips, etc.) for review by Engineer-of-Record.

C. Welding certificates.

D. Qualification Data: For testing agency.

E. Product Test Reports: From a qualified testing agency, unless otherwise stated, indicating that each of the following complies with requirements, based on evaluation of comprehensive tests for current products:

1. Steel sheet.
2. Expansion anchors.
3. Power-actuated anchors.
4. Mechanical fasteners.
5. Vertical deflection clips.
6. Horizontal drift deflection clips
7. Miscellaneous structural clips and accessories.

F. Research/Evaluation Reports: For cold-formed metal framing.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated.

B. 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, and metallic-coating thickness.

C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

D. 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 jurisdiction.

E. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."

1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Truss Design."
2. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."

F. Comply with AISI's "Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings."

G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

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

B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide cold-formed metal framing by one of the following:
1. AllSteel Products, Inc.
2. Craco Metals Manufacturing, LLC.
3. Dale/Incor.
4. Dietrich Metal Framing; a Worthington Industries Company.
5. MarinoWare; a division of Ware Industries.
6. United Metal Products, Inc.

2.2 MATERIALS

A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is 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 Indicated & designed by CFMF engineer.
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: 50 (340), Class 1 or 2.
2. Coating: G60 (Z275).

2.3 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: As indicated
2. Flange Width: As Indicated
3. Section Properties: As Indicated

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: As indicated
2. Flange Width: As Indicated

C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: As indicated
2. Flange Width: As Indicated
3. Section Properties: As Indicated

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: As indicated
2. Section Properties: As Indicated

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: As indicated
2. Flange Width: As Indicated

C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: As indicated
2. Flange Width: As Indicated

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

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Dietrich Metal Framing; a Worthington Industries Company.
b. MarinoWare, a division of Ware Industries.
c. SCAFCO Corporation
d. The Steel Network, Inc.

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 and lateral loads and transfer them to the primary structure, and as follows:

    a. Minimum Base-Metal Thickness: 16 gauge
    b. Flange Width: As Indicated.

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

    a. Minimum Base-Metal Thickness: 16 gauge
    b. Flange Width: As Indicated

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.

2.5 INTERIOR 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: As indicated
2. Section Properties: As Indicated

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: As indicated
2. Flange Width: As Indicated

C. Steel Box or Back-to-Back Headers: Manufacturer's standard C-shapes used to form header beams, of web depths indicated, unpunched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: As indicated
2. Flange Width: As Indicated

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

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Dietrich Metal Framing; a Worthington Industries Company.
    b. MarinoWare, a division of Ware Industries.
    c. SCAFCO Corporation
    d. The Steel Network, Inc.

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 and lateral loads and transfer them to the primary structure, and as follows:

a. Minimum Base-Metal Thickness: 16 gauge
b. Flange Width: As Indicated.

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

a. Minimum Base-Metal Thickness: 16 gauge
b. Flange Width: As Indicated

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.

2.6 FLOOR JOIST FRAMING

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

1. Minimum Base-Metal Thickness: As indicated
2. Flange Width: As Indicated
3. Section Properties: As Indicated

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

1. Minimum Base-Metal Thickness: As indicated
2. Flange Width: As Indicated

2.7 ROOF-RAFTER FRAMING

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

1. Minimum Base-Metal Thickness: As indicated
2. Flange Width: As Indicated
3. Section Properties: As Indicated

2.8 CEILING JOIST FRAMING

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

1. Minimum Base-Metal Thickness: 18 gauge, unless indicated otherwise
2. Flange Width: 1-5/8” inches, unless indicated otherwise

3. Section Properties: As Indicated

2.9 SOFFIT FRAMING

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

1. Minimum Base-Metal Thickness: 16 gauge, unless indicated otherwise
2. Flange Width: 1-5/8” inches, unless indicated otherwise
3. Section Properties: As Indicated

2.10 FRAMING ACCESSORIES

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

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

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

2.11 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 bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

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

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.12 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: ASTM A 780.

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

C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.

D. Shims: Load bearing, high-density multimonomer plastic, nonleaching.

E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.13 FABRICATION

A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.

    a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.

4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

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

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

3.2 PREPARATION

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

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

3.3 INSTALLATION, GENERAL

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

1. For shop-fabricated materials: provide detailed shop drawings including layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.

2. Field verify all existing conditions prior to fabrication to account for any potential construction tolerances of other trades.

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

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

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

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

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

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

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

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

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

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

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

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

3.4 INSTALLATION OF LOAD-BEARING WALL FRAMING

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

B. Squarely seat studs against top and bottom tracks, with gap not exceeding 1/8 inch between the end of wall-framing member and the web of track.

1. Fasten both flanges of studs to top and bottom tracks as indicated.
   a. Do not fasten studs to deflection track, such as in infill wall framing.
2. Space studs as follows:
   a. Stud Spacing: As Indicated by CFMF engineer with maximum 16” o/c.

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

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

E. Align floor and roof framing over studs according to AISI S200, Section C1. Where framing cannot be aligned, continuously reinforce track to transfer loads.

F. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure.

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

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

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

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

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

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

   a. Install solid blocking at centers indicated.

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.

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

3.5 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

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

B. Squarely seat studs against top and bottom tracks, with gap not exceeding 1/8 inch between the end of wall-framing member and the web of track.

1. Fasten both flanges of studs to top and bottom tracks as indicated.
   a. Do not fasten studs to deflection track, such as in infill wall framing.
2. Space studs as follows:
   a. Stud Spacing: As Indicated by CFMF engineer with maximum 16” o/c.

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 double deep-leg deflection tracks and anchor outer track to building structure.
2. Connect vertical deflection clips to bypassing studs and anchor to building structure.
3. Connect drift clips to cold formed metal framing and anchor to building structure.

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

1. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches (305 mm) of single deflection track. Install a combination of flat, taut, steel sheet straps of width and thickness indicated and stud or stud-track solid blocking of width and thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.

   a. Install solid blocking at centers indicated.

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, fasteners, and stud girts, to provide a complete and stable wall-framing system.

3.6 INSTALLATION OF INTERIOR NONLOADBEARING WALL FRAMING

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

B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
   a. Stud Spacing: As Indicated by CFMF engineer with maximum 16” o/c.

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 studs and anchor to building structure.
4. Connect drift clips to cold-formed steel 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 apart. Fasten at each stud intersection.

1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches 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.

1. Install solid blocking at centers indicated.

G. 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.

3.7 INSTALLATION OF JOIST FRAMING

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.

1. Install joists over supporting frame with a minimum end bearing of 1-1/2 inches.
2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections.

C. Space joists not more than 2 inches from abutting walls, and as follows:

1. Joist Spacing: 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 joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement.

1. Install web stiffeners to transfer axial loads of walls above.

F. Install bridging at intervals indicated on Shop Drawings. Fasten bridging at each joist intersection as follows:

1. Joist-Track Solid Bridging: Joist-track solid blocking of width and thickness indicated, secured to joist webs.
2. Combination 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.

G. Secure joists to load-bearing interior walls to prevent lateral movement of bottom flange.

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

3.8 INSTALLATION TOLERANCES.

A. 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 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.

3.9 REPAIR

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

3.10 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.

3.11 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 framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 05 50 00 - METAL FABRICATIONS

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.
B. Division 01, Section 017419 – Construction Waste Management.

1.2 SUMMARY

A. Section Includes:
1. Steel framing and supports for countertops.
2. Steel framing and supports for mechanical and electrical equipment.
3. Steel framing and supports for applications where framing and supports are not specified in other Sections.
4. Loose bearing and leveling plates for applications where they are not specified in other Sections.
5. Metal Ladders & Ladder Safety Cages
6. Metal Downspout Boots
7. Metal Bollards

B. Products furnished, but not installed, under this Section:

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

C. Related Sections:

1. Division 03 Section "Cast-in-Place Concrete" and “Architectural Concrete” for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
2. Division 04 Section "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
3. Division 05 Section "Structural Steel Framing."
4. Division 05 Section "Pipe and Tube Railings."

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design ladders, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

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

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

C. Structural Performance of Aluminum Ladders: Aluminum ladders, including landings, shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.

1.4 SUBMITTALS

A. Product Data: For the following:
1. Paint products.
2. Grout.
3. Ladders
4. Bollards
5. Downspout Boots

B. Shop Drawings: Show fabrication and installation details for metal fabrications, including (but not limited to) ladders, bollards, steel framing and supports, etc.

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

2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Samples for Verification: For metal bollards, metal ladders, and downspout boots.

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

E. Qualification Data: For qualified professional engineer.

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

G. Welding certificates.

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

1.5 QUALITY ASSURANCE

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

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

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

1.6 PROJECT CONDITIONS

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

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

PART 2 - PRODUCTS

2.1 METALS, GENERAL

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

2.2 FERROUS METALS

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

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

C. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

D. Rolled-Stainless-Steel Floor Plate: ASTM A 793.

E. Abrasive-Surface Floor Plate: Steel plate with abrasive granules rolled into surface or with abrasive material metallically bonded to steel.

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. IKG Industries, a division of Harsco Corporation; Mebac.
b. SlipNOT Metal Safety Flooring, a W. S. Molnar company; SlipNOT.
c. Approved equal.

F. Steel Tubing: ASTM A 500, cold-formed steel tubing.

G. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.

H. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.

1. Size of Channels: 1-5/8 by 1-5/8 inches (41 by 41 mm).
2. Material: Galvanized steel, ASTM A 653/A 653M, commercial steel, Type B, with G90 (Z275) coating; 0.108-inch (2.8-mm) nominal thickness.

I. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

2.3 NONFERROUS METALS

A. Aluminum Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6.

B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T6.

C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

D. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

E. Bronze Plate, Sheet, Strip, and Bars: ASTM B 36/B 36M, Alloy UNS No. C28000 (muntz metal, 60 percent copper).

F. Bronze Extrusions: ASTM B 455, Alloy UNS No. C38500 (extruded architectural bronze).

G. Bronze Castings: ASTM B 584, Alloy UNS No. C83600 (leaded red brass) or No. C84400 (leaded semired brass).

H. Nickel Silver Extrusions: ASTM B 151/B 151M, Alloy UNS No. C74500.

I. Nickel Silver Castings: ASTM B 584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

2.4 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless-steel fasteners for fastening aluminum.
2. Provide stainless-steel fasteners for fastening stainless steel.

3. Provide stainless-steel fasteners for fastening nickel silver.
4. Provide bronze fasteners for fastening bronze.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3 (ASTM A 325M, Type 3); with hex nuts, ASTM A 563, Grade C3 (ASTM A 563M, Class 8S3); and, where indicated, flat washers.

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

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

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

E. Eyebolts: ASTM A 489.

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

G. Lag Screws: ASME B18.2.1 (ASME B18.2.3.8M).

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

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

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

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

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

M. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594.

N. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches (41 by 22 mm) by length indicated with anchor straps or studs not less than 3 inches (75 mm) long at not more than 8 inches (200 mm) o.c. Provide with

temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.5 MISCELLANEOUS MATERIALS

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

B. Shop Primers: Provide primers that comply with Division 09 painting Sections.

C. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

D. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

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

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

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

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

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

2.6 FABRICATION, GENERAL

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

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

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

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

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

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.7 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

1. Fabricate units from slotted channel framing where indicated.
2. Furnish inserts for units installed after concrete is placed.

3. Provide bearing plates welded to beams where indicated.
4. Drill or punch girders and plates for field-bolted connections where indicated.
5. Where wood nailers are attached to girders with bolts or lag screws, drill or punch holes at 24 inches (600 mm) o.c.

C. Fabricate steel pipe columns for supporting wood frame construction from steel pipe with steel baseplates and top plates as indicated. Drill or punch baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around. Make welds the same size as pipe wall thickness unless otherwise indicated.

1. Unless otherwise indicated, fabricate from Schedule 40 steel pipe.
2. Unless otherwise indicated, provide 1/2-inch (12.7-mm) baseplates with four 5/8-inch (16-mm) anchor bolts and 1/4-inch (6.4-mm) top plates.

D. Galvanize miscellaneous framing and supports where indicated.

E. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

F. Basis of Design: Countertop Bracket
1. Provide the following product, or approved equal:
   a. Centerline Steel LLC – Front Mounting Plus Bracket
   b. Mount as noted in drawings.
2. Properties:
   a. A36 Steel
   b. Cross Section: Min. 3/8” x 2-1/2”
   c. Finish / Color: TBD

2.8 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

B. Galvanize plates.

C. Prime plates with zinc-rich primer.

2.9 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches (200 mm) unless otherwise indicated.

C. Galvanize loose steel lintels located in exterior walls.

D. Prime loose steel lintels located in exterior walls with zinc-rich primer.

2.10 STEEL WELD PLATES AND ANGLES

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

2.11 FINISHES, GENERAL

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

B. Finish metal fabrications after assembly.

C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.12 STEEL AND IRON FINISHES

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

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

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

1. Shop prime with universal shop primer unless zinc-rich primer is indicated.

C. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:

1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
3. Items Indicated to Receive Primers Specified in Division 09 Section "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
4. Other Items: SSPC-SP 3, "Power Tool Cleaning."

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

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

2.13 ALUMINUM FINISHES

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

B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).

C. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

2.14 METAL ROOF LADDERS

A. Exterior Fixed Roof Ladders: Tubular Rail Low Parapet Access Ladder with Platform and Return.
   1. Basis of Design Product: As noted on drawings.
   2. Walk-Through Rail and Roof Rail Extension: Not less than 3 feet 6 inches (1067 mm) above the landing and shall be fitted with deeply serrated, square, tubular grab rails.
   3. Landing Platform: 1-1/2 inches (38 mm) or greater diameter, tubular aluminum guardrails and decks of serrated aluminum treads.
   4. Provide personal fall arrest system or a ladder safety system.

B. Ladder Materials
   1. Aluminum Sheet: Alloy 5005-H34 to comply with ASTM B209.
   2. Aluminum Extrusions: Alloy 6063-T6 to comply with ASTM B221.

C. Ladder finish: Clear Anodic Finish: AA-M10C22A41 Mechanical finish as fabricated. Architectural Class I, clear coating 0.018 mm or thicker.

D. Rungs: Not less than 1-1/4 inches (32 mm) in section and 18-3/8 inches (467mm) long, formed from tubular aluminum extrusions. Squared and deeply serrated on all sides.
   1. Rungs shall withstand a 1,500 pound (454 kg) load without deformation or failure.
   2. Fit rungs in centerline of siderails; fasten by welding or with stainless-steel fasteners or brackets and aluminum rivets.

E. Support each ladder at top and bottom and not more than 60 inches (1500 mm) o.c. with welded or bolted aluminum brackets.

F. Comply with ANSI A14.3

G. Provide intermediate brackets in order to keep maximum bracket spacing at 10 feet on center. For exterior roof ladders, provide mounting bracket to wall to keep ladder rails above roof.

H. Heavy Duty Tubular Side Rails: Assembled from two interlocking aluminum extrusions no less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide. Construction shall be self-locking stainless steel fasteners, full penetration TIG welds and clean, smooth and burr-free surfaces.

2.15 DOWNSPOUT BOOTS

A. Downspout Boots: Smooth interior without boxed corners or choke points; include integral lug slots, integral cleanout, cleanout cover, and tamper proof fasteners.
   1. Configuration: Offset.
   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 standard range.
   5. Accessories: Manufacturer's standard stainless steel fasteners, stainless steel building wall anchors, integral neoprene gaskets, and rubber coupling.
   6. Available Manufacturers offering Basis of Design products that may be incorporated into the Work include, but are not limited to, the following:
      a. Downspoutboots.com, a division of J. R. Hoe & Sons; O Series

b. Neenah Foundry, a division of Neenah Enterprises, Inc; Model R-4929-O6C

2.16 METAL BOLLARDS

A. Manufacturer (or Approved Equal): Post Guard, distributed by Global Industrial
   a. Basis of Design Product Model No.: CL1686FF

B. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; galvanized finish.

C. Fabricate metal bollards from 6" G-90 galvanized standard weight steel pipe.

   1. Cap bollards with 1/4-inch thick steel plate.
   2. Where bollards are indicated to receive controls for door operators, provide cutouts for controls and holes for wire.
   3. Where bollards are indicated to receive light fixtures, provide cutouts for fixtures and holes for wire.

D. Fill with 3,000 psi concrete.
   1. Slightly overfill top for drainage.

E. Bollard Cover:
   1. High Density Polyethylene (HDPE) post cover
   2. Color: Yellow

F. Fabricate bollards with 3/8-inch thick steel baseplates for bolting to concrete slab. Drill baseplates at all four corners for 3/4-inch anchor bolts.

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

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

PART 3 - **EXECUTION**

3.1 INSTALLATION, GENERAL

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

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

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

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

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

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

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

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

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

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

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

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

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

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

3.3 INSTALLING BEARING AND LEVELING PLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.

B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.

1. Use nonshrink grout, either metallic or nonmetallic, in concealed locations where not exposed to moisture; use nonshrink, nonmetallic grout in exposed locations unless otherwise indicated.
2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 ADJUSTING AND CLEANING

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

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

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

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

END OF SECTION 05 50 00

SECTION 05 51 00 - METAL STAIRS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Interior ornamental stair located in Main Lobby A102.
B. Interior ornamental stair #5 located in Lobby D101 (alternate #7).
C. Interior exit stairs, ST1, ST2, ST3 and ST4.
D. Stairs with grating treads ST8. (Roof access, interior & exterior)
E. Structural steel stair framing and supports.
F. Handrails and guards.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete fill in stair pans; mesh reinforcement for landings.
B. Section 04 20 00 - Unit Masonry: Placement of metal fabrications in masonry.
C. Section 05 50 00 - Metal Fabrications.
D. Section 05 52 13 - Pipe and Tube Railings: Metal handrails and balusters other those specified in this section.
E. Section 05 73 00 - Decorative Metal Railings.
F. Section 09 66 00 - Terrazzo treads.
G. Section 09 90 00 - Paints and Coatings

1.03 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
B. AISC 201 - AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures 2006.
C. ASTM A6/A6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling 2016.
D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
E. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2020.
F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
G. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
H. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates 2013.
I. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2013.
J. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2014.
K. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings 2013.

L. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings 2000 (Reapproved 2006).
M. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions 2015a.
N. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2012.
O. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020.
P. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
Q. NAAMM AMP 510 - Metal Stairs Manual 1992, Fifth Edition.
R. NAAMM MBG 531 - Metal Bar Grating Manual 2009.
S. NAAMM MBG 532 - Heavy Duty Metal Bar Grating Manual 2009.
T. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 1999 (Ed. 2004).
U. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic") 2002 (Ed. 2004).
V. SSPC-SP 2 - Hand Tool Cleaning 1982 (Ed. 2004).

1.04 SUBMITTALS

A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
   2. Include the design engineer's seal and signature on each sheet of shop drawings.
B. Design Data: As required by authorities having jurisdiction.
C. Welders' Certificates.
D. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is certified under AISC 201.

1.05 QUALITY ASSURANCE

A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State of Delaware, or personnel under direct supervision of such an engineer.
B. Drawing review: Structural Engineer of Record will review shop drawings for conformance with the contract documents and the loads specified. Corrections to the shop drawings required by Engineer's review shall not constitute a change in contract amount for pricing and detailing.
C. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.
D. Fabricator Qualifications:
   1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 201.
E. A company specializing in manufacturing products specified in this section, with not less than ten years of documented experience.

PART 2 PRODUCTS

2.01 METAL STAIRS - GENERAL

A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
   1. Regulatory Requirements: Provide stairs and railings complying with the most stringent requirements of local, state, and federal regulations; where requirements of the contract documents exceed those of regulations, comply with the contract documents.
   2. Handrails: Comply with applicable accessibility requirements of ADA Standards.
   3. Structural Design: Provide complete stair and railing assemblies complying with the applicable local code.
      a. Refer to structural drawings for stair construction notes and design loads.
   4. Dimensions: As indicated on drawings.
   5. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
   6. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
   7. Separate dissimilar metals using paint or permanent tape.

B. Metal Jointing and Finish Quality Levels:
   1. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.
      a. Welded Joints: Continuously welded and ground smooth and flush.
      b. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
      c. Exposed Edges and Corners: Eased to small uniform radius.
      d. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality gloss finish.
   2. Commercial (typical unless otherwise noted): Exposed joints as inconspicuous as possible, whether welded or mechanical; underside of stair is covered by soffit, and is not considered exposed to view.
      a. Welded Joints: Intermittently welded on back side, filled with body putty, and sanded smooth and flush.
      b. Welds Exposed to View: Ground smooth and flush.
      c. Mechanical Joints: Butted tight, flush, and hairline.
      d. Bolts Exposed to View: Countersunk flat or oval head bolts; no exposed nuts.
      e. Exposed Edges and Corners: Eased to small uniform radius.
      f. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for satin or matte finish.
   3. Service (access stairs to mechanical areas): Exposed joints tight with face surfaces aligned; underside of stair not covered by soffit is not considered exposed to view.
      a. Welded Joints: Welded on back side wherever possible.
      b. Welds Exposed to View: Ground smooth; not required to be flush.
      c. Bolts Exposed to View: Countersunk flat or oval head bolts; no exposed nuts or screw threads.
      d. Metal Surfaces to be Painted: Sanded smooth, suitable for satin or matte finish.

C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.

D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

2.02 METAL STAIRS WITH PRECAST TERRAZZO TREADS AND LANDINGS (IDENTIFY LOCATION)

A. Jointing and Finish Quality Level: Architectural, as defined above.
B. Risers: Closed.
C. Treads: Metal pan with precast terrazzo tread.
   1. Precast Concrete Terrazzo Tread Thickness: 2 inches, minimum. See Section 09 66 16.
   2. Tread Pan Material: Steel sheet.
   3. Tread Pan Thickness: As required by design; 14 gage, 0.075 inch minimum.
   4. Pan Anchorage to Stringers: Continuously welded, from top or bottom.
D. Risers: Same material and thickness as tread pans.
   1. Riser/Nosing Profile: As shown on drawings.
E. Stringers: Rolled steel channels.
   1. Stringer Depth: As indicated on drawings.
F. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity, with precast terrazzo landings.
G. Railings: Refer to 05 73 00 Decorative Metal Railings.
H. Finish: Shop or factory-prime painted.
I. Under Side of Stair: Exposed to view.

2.03 EXIT STAIRS (IDENTIFY LOCATION)

A. Jointing and Finish Quality Level: Commercial.
B. Risers: Closed.
C. Treads: Metal pan with concrete fill..
   1. Concrete Depth: 2 inches.
   2. Tread Pan Material: Steel sheet.
   3. Tread Pan Thickness: As required by design; 14 gage, 0.075 inch minimum.
   4. Pan Anchorage to Stringers: Continuously welded, from top or bottom.
   5. Concrete Reinforcement: None.
   6. Concrete Finish: For resilient floor covering.
D. Risers: Same material and thickness as tread pans.
   1. Riser/Nosing Profile: Vertical riser with underside of nosing sloped up from bottom of tread pan at not less than 60 degrees from horizontal, with rounded top of nosing of minimum radius.
   2. Nosing Depth: Not more than 1 inch overhang.
   3. Nosing Return: Flush with top of concrete fill, not more than 1/2 inch wide.
E. Stringers: Rolled steel channels.
   1. Stringer Depth: 12 inches.
   2. End Closure: Sheet steel of same thickness as risers welded across ends.
F. Landings: Similar construction, using corrugated steel decking for concrete fill, supported and reinforced as required to achieve design load capacity.
G. Railings: As shown on drawings and specified below.
H. Guards - As shown on drawings and specified below.
I. Finish: Shop or factory-prime painted.
J. Under Side of Stair: Exposed to view.

2.04 METAL STAIRS WITH GRATING TREADS (IDENTIFY LOCATION)

A. Jointing and Finish Quality Level: Service, as defined above.
B. Risers: Closed.

C. Treads: Aluminum bar grating.
   1. Grating Type: Welded.
   2. Bearing Bar Depth: 1 inch, minimum.
   3. Top Surface: Standard.
   4. Nosing: Corrugated.
   5. Nosing Width: 1-1/4 inch, minimum.
   6. Anchorage to Stringers: End plates welded to grating, bolted to stringers.

D. Stringers: Rolled steel channels.
   1. Stringer Depth: 12 inches.
   2. End Closure: Sheet steel, 14 gauge, 0.075 inch minimum; welded across ends.

E. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.

F. Railings: Steel picket railings.

G. Finish: Galvanized after fabrication.

2.05 ORNAMENTAL STAIRS HANDRAILS AND GUARDS (IDENTIFY LOCATION)

A. See Section 05 73 00 - Decorative Metal Railings.

2.06 EXIT STAIRS HANDRAILS AND GUARDS

A. Wall and Post-Mounted Handrails: Stainless Steel, Round pipe unless otherwise indicated.
   1. Outside Diameter: 1-1/4 inch, minimum, to 1-1/2 inches, maximum.

B. Guards:
   1. Top Rails: Stainless steel, round pipe unless otherwise indicated.
      a. Outside Diameter: 1-1/2 inch, minimum, to 2 inches, maximum.
   2. Infill at Picket Railings: Vertical pickets, prime painted.
      a. Horizontal Spacing: Maximum 4 inches on center.
      b. Material: Solid steel bar.
      c. Shape: Square.
      d. Size: 1/2 inch square.
      e. Top Mounting: Welded to steel channel at underside of top rail.
      f. Bottom Mounting: Welded to 1-1/2" square bottom rail.
   3. End and Intermediate Posts: Square tube, prime painted.
      a. Horizontal Spacing: As required to meet design loads.
      b. Mounting: Welded to top surface of stringer.

2.07 MATERIALS

A. Steel Sections: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A500/A500M or ASTM A501/A501M structural tubing, round and shapes as indicated.

C. Steel Plates: ASTM A6/A6M or ASTM A283/A283M.

D. Pipe: ASTM A 53/A 53M Grade B Schedule 40, black finish.

E. Ungalvanized Steel Sheet: Hot- or cold-rolled, except use cold-rolled where finished work will be exposed to view.
   1. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Designation CS (commercial steel); SS (Structural), Grade 33.
   2. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Designation CS (commercial steel); SS (Structural), Grade 33, Type1.

F. Gratings: Bar gratings that comply with NAAMM MBG 531 or NAAMM MBG 532, whichever applies based on bar sizes.

G. Concrete Fill: Type specified in Section 03 30 00.

2.08 ACCESSORIES

A. Steel Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, and galvanized to ASTM A153/A153M where connecting galvanized components.
B. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
C. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
D. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic, and comply with VOC limitations of authorities having jurisdiction.

2.09 SHOP FINISHING

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
B. Do not prime surfaces in direct contact with concrete or where field welding is required.
C. Prime Painting: Use specified shop- and touch-up primer.
    1. Preparation of Steel: In accordance with SSPC-SP 2 Hand Tool Cleaning.
    2. Number of Coats: Two.
D. Galvanizing: Hot-dip galvanize to minimum requirements of ASTM A123/A123M.
    1. Touch up abraded areas after fabrication using specified touch-up primer for galvanized surfaces.

PART 3 EXECUTION

4.01 EXAMINATION

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

4.02 PREPARATION

A. When field welding is required, clean and strip primed steel items to bare metal.
B. Supply items required to be embedded in masonry with setting templates.

4.03 INSTALLATION

A. Install components plumb and level, accurately fitted, free from distortion or defects.
B. Provide anchors, plates, angles, hangers, and struts required for connecting stairs to structure.
C. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
D. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1/D1.1M.
E. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.
F. Obtain approval prior to site cutting or creating adjustments not scheduled.
G. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

4.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION

SECTION 05 51 33
METAL LADDERS

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Prefabricated ladders.

1.02 REFERENCE STANDARDS
- A. 29 CFR 1910.23 - Ladders Current Edition.
- B. 29 CFR 1926.1053 - Ladders Current Edition.
- C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- D. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2022.
- E. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2022.
- F. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2022.
- G. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements 2008 (Reaffirmed 2018).
- H. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings 2018, with Editorial Revision.
- I. ASTM B85/B85M - Standard Specification for Aluminum-Alloy Die Castings 2018, with Editorial Revision.
- J. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.
- K. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes 2019a.
- L. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire 2019.
- M. AWS D1.2/D1.2M - Structural Welding Code - Aluminum 2014, with Errata (2020).
- N. SSPC-SP 2 - Hand Tool Cleaning 2018.

1.03 SUBMITTALS
- A. See Section 01 30 00 - 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.

PART 2 PRODUCTS

2.01 MATERIALS - ALUMINUM
- A. Extruded Aluminum: ASTM B211/B211M, 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.

2.02 PREFABRICATED LADDERS

A. Prefabricated Ladder: Welded metal unit complying with ANSI A14.3; factory fabricated to greatest degree practical and in the largest components possible.
   1. Components: Manufacturer's standard rails, rungs, treads, handrails. returns, platforms and safety devices complying with the requirements of the MATERIALS article of this section.
   2. Materials: Aluminum; ASTM B211/B211M 6063 alloy, T52 temper.
   3. Finish: Mill finish aluminum.
   4. Manufacturers:
      a. Industrial Ladder & Scaffolding, Inc.: www.anyladder.com/#sle.
      b. Basis of Design: O'Keeffe's Inc; Model 500: www.okeeffes.com/#sle.
      c. Precision Ladders, LLC; Fixed Alumnium Wall Ladder: www.precisionladders.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 FINISHES - ALUMINUM

A. Exterior Aluminum Surfaces: Class I natural anodized.
B. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 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. Obtain approval prior to site cutting or making adjustments not scheduled.

END OF SECTION 05 51 33

SECTION 05 52 13 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES
- A. Wall mounted handrails.
- B. Free-standing railings.

1.02 RELATED REQUIREMENTS
- A. Section 05 51 00 - Metal Stairs: Handrails other than those specified in this section.
- B. Section 05 73 00 - Decorative Metal Railings
- C. Section 09 21 16 - Gypsum Board Assemblies: Placement of backing plates in stud wall construction.
- D. Section 09 90 00 - Paints and Coatings

1.03 REFERENCE STANDARDS
- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. AISC 201 - AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures 2006.
- C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2020.
- D. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2014.
- E. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings 2013.
- F. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings 2000 (Reapproved 2006).
- G. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 1999 (Ed. 2004).

1.04 SUBMITTALS
- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

1.05 QUALITY ASSURANCE
- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in Delaware, or personnel under direct supervision of such an engineer.
- B. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.
- C. Fabricator Qualifications:
  1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 201.
  2. A company specializing in manufacturing products specified in this section, with not less than ten years of documented experience.

PART 2 PRODUCTS

2.01 RAILINGS - GENERAL REQUIREMENTS

A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 50 pounds per linear foot applied to the top of the assembly and in any direction, without damage or permanent set.
C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds applied at any point on the top of the assembly and in any direction, without damage or permanent set.
D. Allow for expansion and contraction of members and building movement without damage to connections or members.
E. Dimensions: See drawings for configurations and heights.
F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
G. Provide welding fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.02 STEEL RAILING SYSTEM (TYPICAL, U.O.N.)

A. Exterior railings and guards:
    1. Stainless steel.
B. Interior railings and guards:
    1. Painted steel, with stainless steel handrails and top rail.
    2. Wall and Post-Mounted Handrails: Stainless Steel, Round pipe unless otherwise indicated.
        a. Outside Diameter: 1-1/4 inch, minimum, to 1-1/2 inches, maximum.
    3. Guards:
        a. Top Rails: Stainless steel, round pipe unless otherwise indicated.
            1) Outside Diameter: 1-1/2 inch, minimum, to 2 inches, maximum.
        b. Infill at Picket Railings: Vertical pickets.
            1) Horizontal Spacing: Maximum 4 inches on center.
            2) Material: Solid steel bar.
            3) Shape: Square.
            4) Size: 1/2 inch square.
            5) Top Mounting: Welded to steel channel at underside of top rail.
            6) Bottom Mounting: Welded to 1-1/2" square bottom rail.
        c. End and Intermediate Posts: Square tube.
            1) Horizontal Spacing: As required to meet design loads.
            2) Mounting: Welded to top surface of stringer.
C. Steel Tube: ASTM A501/A501M hot-formed structural tubing.
D. Steel Pipe: ASTM A53/A53M Grade B Schedule 80, black finish.
E. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
F. Exposed Fasteners: No exposed bolts or screws.

G. Straight Splice Connectors: Steel concealed spigots.
H. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.03 FABRICATION

A. Accurately form components to suit specific project conditions and for proper connection to building structure.
B. Fit and shop assemble components in largest practical sizes for delivery to site.
C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
D. Welded Joints:
   1. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
   2. Interior Components: Continuously seal joined pieces by continuous welds.
   3. 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.

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 items required to be cast into concrete or embedded in masonry with setting templates, for installation as work of other sections.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
C. Install railings in compliance with ADA Standards for accessible design at applicable locations.
D. Anchor railings securely to structure.
E. Field weld anchors as indicated on shop drawings. Touch-up welds with primer. Grind welds smooth.
F. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.
B. Maximum Offset From True Alignment: 1/4 inch.
C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 05 58 00 - ARCHITECTURAL METAL COLUMN COVERS

PART 1 - GENERAL

1.01 SUMMARY

A. Architectural Metal Column Cover Systems included in Alternate 5B as shown on drawings and schedules.

B. Drawings and general provisions of the Contract Documents apply to work of this section.

1.02 SUBMITTALS

A. Manufacturer's product data, specification, and installation instructions.

B. Color and texture samples.

1. For Architect's initial selection: Three physical brochures illustrating manufacturer's entire line of standard non-premium colors and textures.
   a. Referral to manufacturer's
2. For confirmation: Three physical samples of color and texture initially selected. Standard sample size is 5" x 7".

C. Complete shop drawings indicating quantities, dimensions, finishes, and attachment details.

1.03 QUALITY ASSURANCE

A. Manufacturer shall have a minimum of 5 years' experience in manufacturing architectural metals.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the project site in manufacturer's original packaging, properly labeled for identification and installation purposes.

B. Store in location to avoid damage from job-site traffic, direct sunlight, moisture, stacking or other job-site contaminates.

C. Handle components to avoid denting or scratching of finished surfaces.

1.05 WARRANTY

A. Provide manufacturer's warranty against defects in material and workmanship for a period of one year.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Acceptable products include column covers manufactured by:

1. Fry Reglet Corp.
   1377 Stonefield Court
   Alpharetta, GA 30004
   Phone: 800-955-2343
   Email: sales@fryreglet.com
2. Móz Designs, Inc.
   711 Kevin Court,
   Oakland, CA 94621
   Phone: 510-632-0853
   Email: info@mozdesigns.com
3. Gordon Incorporated

a. 5023 Hazel Jones Road, Bossier City, LA 71111
b. Phone : 800-747-8954
c. www.gordon-inc.com

B. Substitutions: See Section 016000 Materials and Equipment.

2.02 PRODUCTS

A. Type 1: Basis of Design: Fry Reglet Corp., Model KS.
1. Material
a. Stainless steel: Type 304 stainless steel, complying with ASTM A789.
b. Thickness: 14 ga
c. Finish: To be selected by Architect from manufacturer's standard colors and textures.
2. Manufactured Parts
a. Full Round in two sections.
b. Diameter/Size: Refer to drawings for dimensions.
c. Height: Refer to drawings for dimensions.
d. Vertical joints: Soft V butt joints.
e. Options:
1) Recessed Base (RB) 6" brushed stainless.
3. At each column cover, provide Fry Reglet Corp. Reveal Wall Angle Column Ring for acoustical or gypsum board ceilings as required.
a. Reveal: 3/4" x 3/4"
b. Application: Drywall or Acoustical as required.
c. Finish: White baked enamel.

B. Fabrication
1. Form column covers to specified dimensions and diameters as indicated on shop drawings.
2. Provide column covers in sections a maximum 12'-0" tall per section.
3. Provide additional sections to achieve finished heights above 12'-0".
4. Columns shall have no exposed fasteners unless specified.
5. Provide additional bracing components as necessary to stiffen substructure and insure solid mid-span bracings and connections.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine job-site conditions for conditions that may adversely affect installation of column covers.
B. Verify dimensions of column covers prior to installation to assure compatibility with job-site conditions.
C. Verify post structure is plumb, level, and parallel prior to installation of column covers.
D. Visually examine finished surfaces to assure that blemished or dented surfaces are not present prior to installation.

3.02 PREPARATION

A. Verify/coordinate with other trades prior to installation insofar as they are affected by column cover installation.

3.03 INSTALLATION

A. Install components in accord with manufacturer's installation instructions and approved shop drawings.

B. Anchor components to related structures such as floors, walls and beams as indicated on approved shop drawings. Use anchors with holding strength to provide a solid installation. Use only plated, galvanized or stainless steel anchors.

3.04 CLEANING

A. Remove protective coverings and clean column covers to remove adhesives and tape residue. Test all solvents on non-exposed surfaces prior to use.
   1. For painted surfaces, use a mild detergent solution on a soft cloth.
   2. For stainless steel, use a glass cleaner and a soft cloth.
   3. For other surfaces, contact manufacturer for proper cleaning procedures.

B. Visually inspect all exposed surfaces for scratches or blemishes.

C. Protect column covers from damage during remainder of construction period.

3.05 SCHEDULE

END OF SECTION

SECTION 05 73 00 - DECORATIVE METAL RAILINGS

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Stainless steel decorative railings and guards, with stainless picket infill panels.
   1. Location: Interior ornamental stair in Lobby 100/200 (alternate #9) and Auditorium.

1.02 RELATED REQUIREMENTS

A. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance (O&M) data, warranties and bonds.
B. Section 03 30 00 - Cast-in-Place Concrete: Placement of anchors in concrete.
C. Section 05 51 00 - Metal Stairs: Handrails other than those specified in this section.
D. Section 05 52 13 - Pipe and Tube Railings
E. Section 09 21 16 - Gypsum Board Assemblies: Placement of backing plates in stud wall construction.

1.03 REFERENCE STANDARDS

A. ASTM A29/A29M - Standard Specification for General Requirements for Steel Bars, Carbon and Alloy, Hot-Wrought 2020.
B. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes 2017.
C. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing 2021.
D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
E. ASTM A743/A743M - Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application 2021.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product data: Manufacturer's product lines of railings assembled from standard components.
C. Shop drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
D. Samples for verification.
   1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
   2. Fittings and brackets.
   3. Assembled Samples of railing systems, made from full-size components, including top rail, post, handrail, and infill. Show method of finishing members at intersections. Samples need not be full height.
E. Design Calculations Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.06 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 Delaware.
B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.
C. Installer Requirements: Installed by manufacturer or manufacturer certified installer.
D. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
   2. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.07 MOCK-UP

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
B. Build mockups as one section of rail.
C. Build mockups for each form and finish of railing consisting of two posts, top rail, infill area, and anchorage system components that are full height and are not less than 24 inches (600 mm) in length.
D. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.08 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.09 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
B. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 RAILINGS - GENERAL REQUIREMENTS

A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 50 pounds per linear foot applied to the top of the assembly and in any direction, without damage or permanent set.
C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds applied at any point on the top of the assembly and in any direction, without damage or permanent set.
D. Allow for expansion and contraction of members and building movement without damage to connections or members.

2.02 MANUFACTURERS

A. Viva Railings. (Basis of Design): https://vivarailings.com
   1. Basis of Design Railing System: Viva Railings CUBE post railing system.
B. Equivalent Products of the following manufacturers are also approved:
   1. Julius Blum & Co.

2. CraneVeyor Corp.
3. InvisiRail.
4. Tri Tech, Inc.
5. Morse Industries.

C. Substitutions: See Section 01 60 00.

2.03 RAILING DESIGN

A. Description: Railing system comprised of 2”x 2” square posts, terminating into monolithic pyramid top cap to provide continuous clean lines throughout the components. Railing in-fill between the posts is mounted via fixed point holders for mounting stainless steel perforated metal infill.

B. Posts:
1. Size: 2" x 2" square.
2. Material: Type 304 stainless steel.
3. Finish: #6 satin.

C. Infill
1. Perforated metal infill panel – pattern type – round, Size x center 6mm x10 mm, open area 40%, 1” wide frame. (DOES VIVA HAVE A PROPRIETARY NAME ?)
   a. Size: varies.
   b. material: Type 304 stainless steel.
   c. Finish: #6 satin.

D. Top rail:
1. Size: 1 1/2" diameter.
2. Material: Type 304 stainless steel.
3. Finish: #6 satin.

E. Handrail:
1. Size: 1.5" diameter.
2. Material: Type 304 stainless steel.
3. Finish: #6 satin.

2.04 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.
1. Provide cast-stainless steel wall brackets with flange tapped for concealed anchorage with vertical and horizontal adjustment capability.

2.05 STAINLESS STEEL

A. Tubing: ASTM A 554, Grade MT 304.

B. Pipe: ASTM A 312/A 312M, Grade TP 304.

C. Castings: ASTM A 743/A 743M, Grade CF 8 or CF 20.

D. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304.
1. Bars and Shapes: ASTM A 276, Type 304.

2.06 FASTENERS

A. Fastener Materials: Unless otherwise indicated, provide the following:
1. Stainless-Steel Components: Type 304 stainless-steel fasteners.
2. Uncoated Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating where concealed; Type 304 stainless-steel fasteners where exposed.

3. Galvanized-Steel Components: Plated-steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating.
4. Dissimilar Metals: Type 304 stainless-steel fasteners.

B. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated, and capable of withstanding design loads.
1. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work unless otherwise indicated.

C. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193.

2.07 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
D. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

2.08 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
D. Form work true to line and level with accurate angles and surfaces.
E. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
F. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.

G. Form changes in direction as follows:
1. By flush bends.

H. Close exposed ends of hollow railing members with prefabricated end fittings.
I. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated.
J. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

K. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

2.09 GENERAL FINISH REQUIREMENTS

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

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.

2.10 STAINLESS STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Dull Satin Finish: No. 6.

C. When polishing is completed, rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 EXECUTION

3.01 EXAMINATION

A. Installation Tolerances: Structural steel and concrete slabs to be within 1/8 inch (3 mm) in 10 ft (3.048 m) horizontally and 1/8 inch (3 mm) vertically. Correct conditions out-of-tolerance to meet railing manufacturer’s requirements.

3.02 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (5 mm in 3 m).

C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

D. Adjust railings before anchoring to ensure matching alignment at abutting joints.

E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.03 RAILING CONNECTIONS

A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2

inches (50 mm) beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches (150 mm) of post.

3.04 ANCHORING POSTS

A. Form or core-drill holes in accordance with engineering requirements for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.
B. Cover anchorage joint with flange of same metal as post, attached to post with set screws.
C. Anchor posts to metal surfaces with flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
    1. For stainless-steel railings, weld flanges to posts and bolt to metal-supporting surfaces.

3.05 ATTACHING RAILINGS

A. Anchor railing ends to concrete and masonry with brackets on underside of rails connected to railing ends and anchored to wall construction with anchors and bolts.
B. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces and connected to railing ends using nonwelded connections.
C. Attach handrails to walls with wall brackets. Provide brackets with 2-1/4-inch (57-mm) clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
    1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt] [predrilled hole for exposed bolt anchorage.
D. Secure wall brackets and railing end flanges to building construction as follows:
    1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
    2. For hollow masonry anchorage, use toggle bolts.
    3. For steel-framed partitions, use hanger or lag bolts set into fire-retardant-treated wood backing between studs. Coordinate with stud installation to locate backing members.

3.06 CLEANING

A. Clean stainless steel by washing thoroughly with clean water and soap, rinsing with clean water, and wiping dry.

3.07 PROTECTION

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

END OF SECTION

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.01 SECTION INCLUDES
- A. Sheathing.
- B. Roofing nailers.
- C. Preservative treated wood materials.
- D. Fire retardant treated wood materials.
- E. Miscellaneous framing and sheathing.
- F. Communications and electrical room mounting boards.
- G. Concealed wood blocking, nailers, and supports.

1.02 RELATED REQUIREMENTS
- A. Section 03 30 00 - Cast-in-Place Concrete: Setting anchors in concrete.
- B. Section 07 25 00 - Weather Barriers: Air barrier over sheathing.
- C. Section 09 21 16 - Gypsum Board Assemblies: Gypsum-based sheathing.

1.03 REFERENCE STANDARDS
- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- B. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing 2010.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- D. AWPA U1 - Use Category System: User Specification for Treated Wood 2012.
- E. PS 1 - Structural Plywood 2009.
- F. PS 2 - Performance Standard for Wood-Based Structural-Use Panels 2010.
- G. PS 20 - American Softwood Lumber Standard 2010.

1.04 SUBMITTALS
- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials and rough carpentry products.
- C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.
- D. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING
- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

1.06 WARRANTY
- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
   2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

B. Lumber fabricated from old growth timber is not permitted.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Sizes: Nominal sizes as indicated on drawings, S4S.

B. Moisture Content: Kiln-dry or MC15.

C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.03 CONSTRUCTION PANELS

A. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

B. Other Applications:
   1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
   2. Other Locations: PS 1, C-D Plugged or better.

2.04 ACCESSORIES

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
   2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
   3. Anchors: Toggle bolt type for anchorage to hollow masonry.

B. Water-Resistive Barrier: As specified in Section 07 25 00.

2.05 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
   2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Fire Retardant Treatment:
   1. Manufacturers:
      a. Arch Wood Protection, Inc: www.wolmanizedwood.com.
      b. Hoover Treated Wood Products, Inc: www.frtw.com.

c. Koppers, Inc: www.koppers.com.
d. Substitutions: See Section 01 60 00 - Product Requirements.

2. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
   a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
   b. Treat plywood panels that are a substrate for GFRC trim.
   c. Treat other rough carpentry items as indicated.
   d. Do not use treated wood in direct contact with the ground.
3. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
   a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
   b. Treat interior plywood sheathing for story steps and built-in benches.
   c. Treat rough carpentry items as indicated .
   d. Do not use treated wood in applications exposed to weather or where the wood may become wet.

C. Preservative Treatment:
1. Manufacturers:
   a. Arch Wood Protection, Inc: www.wolmanizedwood.com.
   b. Koppers Performance Chemicals, Inc: www.koppersperformancechemicals.com.
   c. Substitutions: See Section 01 60 00 - Product Requirements.
2. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
   a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
   b. Treat lumber exposed to weather.
   c. Treat lumber in contact with flashing or waterproofing.
   d. Treat lumber in contact with masonry or concrete.
   e. Treat lumber less than 18 inches above grade.
   f. Treat lumber in other locations as indicated.
   g. Treat lumber used for wood blocking within cavity wall construction..
3. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.
   a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
   b. Treat plywood in contact with flashing or waterproofing.
   c. Treat plywood in contact with masonry or concrete.
   d. Treat plywood less than 18 inches above grade.
   e. Treat plywood in other locations as indicated.
   f. Treat plywood used for wood blocking within cavity wall construction..

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the 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.

3.02 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/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 other method of support is explicitly indicated.
E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
F. Provide the following specific non-structural 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.
    10. Smartboard and monitor mounts.

3.03 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
B. Provide wood curb at all roof openings except where specifically indicated otherwise. Form corners by alternating lapping side members.

3.04 INSTALLATION OF CONSTRUCTION PANELS

A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using screws.
    1. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges and ends.
B. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
    1. At fire-rated walls, install board over wall board indicated as part of the 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, installed horizontally at ceiling height.

3.05 SITE APPLIED WOOD TREATMENT

A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.
B. Allow preservative to dry prior to erecting members.

3.06 CLEANING

A. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
B. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 20 00 - FINISH CARPENTRY

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Finish carpentry items.
   1. Custom solid surfacing reception desk.
   2. Wood veneer paneling and trim at Stage and Proscenium, stained finish.
   3. Plastic laminate veneer paneling.
   4. Standing and running wood trim, stained finish.
   5. Hang doors, install hardware.

B. Hardware and attachment accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.

B. Section 12 36 00 - Countertops, Backsplashes and Window Stools: Solid Surface material.

1.03 REFERENCE STANDARDS

A. ANSI A208.1 - American National Standard for Particleboard 2016.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.

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, U.S. Version 3.1 2017, with Errata (2019).

F. BHMA A156.9 - American National Standard for Cabinet Hardware 2015.

G. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood 2009.

H. NEMA LD 3 - High-Pressure Decorative Laminates 2005.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

1.05 SUBMITTALS

A. Product Data:
   1. Provide manufacturer's product data, storage and handling instructions for factory-fabricated units and scheduled products.
   2. Provide data on fire retardant treatment materials and application instructions.
   3. Provide instructions for attachment hardware and finish hardware.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
   1. Provide the information required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
   2. Include certification program label.

C. Samples: Plastic laminate for finish selection.

D. Samples: Submit two samples of prefinished wood trim 12 inch long.

E. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

1.06 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five 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.
   2. Single Source Responsibility: Provide and install this work from single fabricator.

B. 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 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.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.

B. Protect work from moisture damage.

C. Handle materials and products to prevent damage to edges, ends, or surfaces.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS

A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Surface Burning Characteristics: Provide materials having fire and smoke properties as required by applicable code.

C. Interior Woodwork Items:
   1. Moldings, Bases, Casings, and Miscellaneous Wood Trim: White Maple; transparent finish.
   2. Wall panels: White Maple veneer plywood, with matching hardwood edge.
   3. Window Stools and Aprons: Solid Surface Material, see Section 12 36 00.
   4. Custom Reception Desks: Vertical components: 5/16” bullet resistant sheathing (basis of design: ArmorCore by Waco Composites - see section 09 21 16), solid surface finish – see Section 12 36 00. Counters: solid surface - see Section 12 36 00.
   5. Custom solid surfacing locker surrounds: Vertical components and Counter: Solid Surface Material, see Section 12 36 00.
   6. Custom plastic laminate and solid surfacing benches at History Steps (Lobby 100), Grand Stair bench (Lobby 100,alternate #9) and Bench and Wall Protection at Upper Lobby 200: Vertical components: plastic laminate finish. Horizontal surface: solid surface - see Section 12 36 00.

2.02 WOOD-BASED COMPONENTS

A. Wood fabricated from old growth timber is not permitted.

2.03 LUMBER MATERIALS

A. Hardwood Lumber: White Maple species, quarter sawn, maximum moisture content of 6 percent, of quality suitable for transparent finish.

B. Hardwood Lumber for Opaque finish: Poplar species, plain sawn, maximum moisture content of 6 percent, of quality suitable for opaque (painted) finish.

2.04 SHEET MATERIALS

A. Hardwood Plywood: Face species White Maple, quarter cut, book matched, medium density fiberboard core; HPVA HP-1 Front Face Grade AA, Back Face Grade 1, glue type as recommended for application.

B. Particleboard: ANSI A208.1 Composed of wood chips, sawdust, or flakes of medium density, made with waterproof resin binders; of grade to suit application; sanded faces.

2.05 PLASTIC LAMINATE MATERIALS

A. Plastic Laminate: NEMA LD 3, HGS; color as selected by Architect; satin finish.

B. Laminate Backing Sheet: NEMA LD 3, BKL; undecorated plastic laminate.

C. Laminate Adhesive: Type recommended by laminate manufacturer to suit application; not containing formaldehyde or other volatile organic compounds.

2.06 FASTENINGS

A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.

B. Concealed Joint Fasteners: Threaded steel.

2.07 SOLID SURFACE MATERIAL

A. See Section 12 36 00.

2.08 ACCESSORIES

A. Primer: as specified in Section 09 90 00.

B. Wood Filler: Solvent base, tinted to match surface finish color.

2.09 HARDWARE

A. Hardware: Comply with BHMA A156.9.

2.10 WOOD TREATMENT

A. Fire Retardant Treatment (FR-S Type): Chemically treated and pressure impregnated; capable of providing flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.

B. Shop pressure treat wood materials requiring fire rating to concealed wood blocking.

C. Provide identification on fire retardant treated material.

D. Redry wood after pressure treatment to maximum 10 percent moisture content.

2.11 FABRICATION

A. Shop assemble work for delivery to site, permitting passage through building openings.

B. Fit exposed sheet material edges with 3/8 inch matching hardwood edging. Use one piece for full length only.

C. Cap exposed plastic laminate finish edges with material of same finish and pattern.

D. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

E. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.

F. Apply laminate backing sheet to reverse face of plastic laminate finished surfaces.

2.12 SHOP FINISHING

A. Apply wood filler in exposed nail and screw indentations.
B. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.
C. 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 - 11, Polyurethane, Catalyzed.
        b. Sheen: Satin.
D. Back prime woodwork items to be field finished, prior to installation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.
B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.02 INSTALLATION

A. Hang doors and install hardware.
B. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.
C. Set and secure materials and components in place, plumb and level.
D. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
E. Install interior wood trim with finish nails or finish screws, set for filler.
F. Install solid surface window stools.

3.03 SITE APPLIED WOOD TREATMENT

A. Apply preservative treatment in accordance with manufacturer's instructions.
B. Brush apply one coats of preservative treatment on wood in contact with cementitious materials. Treat site-sawn cuts.
C. Allow preservative to dry prior to erecting members.

3.04 PREPARATION FOR SITE FINISHING

A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
B. Before installation, prime paint surfaces of wood items or assemblies to be in contact with cementitious materials.

3.05 TOLERANCES

A. Maximum Variation from True Position: 1/16 inch.
B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

SECTION 07 05 53 - FIRE AND SMOKE ASSEMBLY IDENTIFICATION

PART 1 - GENERAL

1.01 SECTION INCLUDES
- A. Identification markings for fire and smoke rated partitions, and fire rated walls.

1.02 RELATED REQUIREMENTS
- A. Section 09 90 00 - Paints and Coatings: Paint finish.

1.03 REFERENCE STANDARDS
- A. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS
- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of marking, indicating font, foreground and background colors, wording, and overall dimensions.
- C. Schedule: Completely define scope of proposed marking, and indicate location of affected walls and partitions, and number of markings.

1.05 FIELD CONDITIONS
- A. Do not install painted markings when ambient temperature is lower than recommended by coating manufacturer.

PART 2 PRODUCTS

3.01 FIRE AND SMOKE ASSEMBLY IDENTIFICATION
- A. Regulatory Requirements: Comply with "Marking and Identification" requirements of "Fire-Resistance Ratings and Fire Tests" chapter of ICC (IBC).

PART 3 EXECUTION

5.01 EXAMINATION
- A. Verify that substrate surfaces are ready to receive work.

5.02 PREPARATION
- A. See Section 09 90 00 for substrate preparation for painted markings.

5.03 INSTALLATION
- A. Locate markings as required by ICC (IBC).
- B. Install neatly, with horizontal edges level.
- C. Protect from damage until Date of Substantial Completion; repair or replace damaged markings.

END OF SECTION

SECTION 07 13 00
SHEET WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Self-adhered rubberized asphalt sheet membrane.
- B. Self-adhered HDPE sheet membrane.

1.02 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 D570 - Standard Test Method for Water Absorption of Plastics 2022.
- D. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers 2000 (Reapproved 2020).
- E. ASTM D638 - Standard Test Method for Tensile Properties of Plastics 2022.
- F. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact 2020.
- G. ASTM D751 - Standard Test Methods for Coated Fabrics 2019.
- H. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting 2018.
- I. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds 1998 (Reapproved 2017).
- J. ASTM D1876 - Standard Test Method for Peel Resistance of Adhesives (T-Peel Test) 2008 (Reapproved 2023).
- K. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection 2021.
- L. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers 2022.
- M. ASTM D5295/D5295M - Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems 2018.
- N. ASTM D5385/D5385M - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes 2020.
- O. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022a, with Editorial Revision (2023).
- P. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover 2008a (Reapproved 2019).
- Q. NRCA (WM) - The NRCA Waterproofing Manual 2021.

1.03 SUBMITTALS
- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data for membrane.
- C. Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Indicate special procedures.
- E. Manufacturer's qualification statement.

F. Installer's qualification statement.
G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 10 years of documented experience.
B. Installer Qualifications: Company specializing in performing work of the type specified and with at least 5 years of documented experience.

1.05 FIELD CONDITIONS

A. Maintain ambient temperatures above 40 degrees F (5 degrees C) for 24 hours before and during application and until liquid or mastic accessories have cured.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
B. Contractor to correct defective Work within period of five years after Date of Substantial Completion; remove and replace materials concealing waterproofing at no extra cost to Owner.
C. Provide 10 year manufacturer warranty for waterproofing failing to resist penetration of water, except where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.

PART 2 PRODUCTS

2.01 SHEET WATERPROOFING APPLICATIONS

A. Self-Adhered Rubberized Asphalt Sheet Membrane:
   1. Location: Foundations.
   2. Cover with protection board.
B. Self-Adhered HDPE Sheet Membrane:
   1. Location: Elevator Pit, and Automotive Paint Booth Pit.

2.02 SHEET WATERPROOFING MATERIALS

A. Self-Adhered Rubberized Asphalt Sheet Membrane:
   1. Thickness: 63 mil, 0.061 inch (1.6 mm), minimum.
   2. Sheet Width: 3.28 feet (1 m), minimum.
   3. Tensile Strength:
      a. Film: 15,000 psi (103.42 MPa), minimum, measured in accordance with ASTM D882 and at grip-separation rate of 2 inches (50 mm) per minute.
      b. Membrane: 425 psi (2.93 MPa), minimum, measured in accordance with ASTM D412 Method A, using die C and at spindle-separation rate of 2 inches (50 mm) per minute.
   4. Elongation at Break: Greater than 200 percent, minimum, measured in accordance with ASTM D412.
   5. Water Vapor Permeance: 0.05 perm (2.9 ng/(Pa s sq m)), maximum, measured in accordance with ASTM E96/E96M.
   6. Low Temperature Flexibility: Unaffected when tested in accordance with ASTM D1970/D1970M at minus 25 degrees F (minus 32 degrees C), 180 degree bend on 1 inch (25 mm) mandrel.
   7. Peel Adhesion to Concrete: 9 lb/inch (1.02 N/m), minimum, when tested in accordance with ASTM D903.
   8. Lap Adhesion: 9 lb/inch (1.02 N/m), minimum, measured in accordance with ASTM D4541.
   9. Puncture Resistance: 60 lb (27.2 kg), minimum, in accordance with ASTM E154/E154M.

10. Water Absorption: 0.1 percent increase in weight, maximum, measured in accordance with ASTM D570, 24 hour immersion.
11. Hydrostatic Pressure Resistance: Membrane resists leakage for at least one hour from pressure equivalent to 200 feet (61 m) head of water applied in accordance with test method ASTM D5385/D5385M.
12. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.

B. Self-Adhered HDPE Sheet Membrane: Recommended by manufacturer for placement below concrete slabs and on outside face of below grade walls before placement of concrete.
1. Sheet Thickness: 32 mil, 0.032 inch (0.8 mm), minimum.
2. Low Temperature Flexibility: Unaffected when tested in accordance with ASTM D1970/D1970M at minus 20 degrees F (minus 29 degrees C), 180 degree bend on 1 inch (25 mm) mandrel.
3. Hydrostatic Pressure Resistance: Membrane resists leakage for at least one hour from pressure equivalent to 231 feet (70.4 m) head of water applied in accordance with test method ASTM D5385/D5385M.
4. Elongation at Break: 500 percent, minimum, measured in accordance with ASTM D412.
5. Tensile Strength, Film: 3,500 psi (24 MPa), minimum, measured in accordance with ASTM D412.
6. Adhesion: 150 psi (1.03 MPa), minimum, measured in accordance with ASTM D4541.
7. Water Vapor Permeance: 0.01 perm (0.6 ng/(Pa s sq m)), maximum, measured in accordance with ASTM E96/E96M.
8. Lateral Water Migration Resistance: Resists pressure of 231 ft (70 m) head of water, when tested in accordance with ASTM D5385/D5385M.
9. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.

2.03 ACCESSORIES

A. Seaming Materials: As recommended by membrane manufacturer.
B. Membrane Sealant: As recommended by membrane manufacturer.
C. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrates and waterproofing materials.
D. Protection Board: Provide type capable of preventing damage to waterproofing due to backfilling and construction traffic.
E. Drainage Panel: Drainage layer with geotextile filter fabric on earth side.
1. Composition: Dimpled polystyrene, polyethylene, or polypropylene core; polypropylene filter fabric.
F. Self-Adhered Flashing: Composite membrane with top layer consisting of Ketone Ethylene Ester (KEE) reinforced membrane and backed by bottom layer of synthetic butyl adhesive covered with release paper.
G. Preformed Flashing Shapes: Injected or vacuum molded one piece shapes used for detailing of inside and outside corners, protrusions, and transitions.
1. Color: Black.
H. Flexible Flashings: Type recommended by membrane manufacturer.
I. Adhesives: As recommended by membrane manufacturer.
J. Thinner and Cleaner: As recommended by adhesive manufacturer, compatible with sheet membrane.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions are acceptable prior to starting work.
B. Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.
C. Verify that items penetrating surfaces to receive waterproofing are securely installed.
D. Where existing conditions are responsibility of another installer, notify Architect of unsatisfactory conditions.
E. Do not proceed with work until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Protect adjacent surfaces from damage not designated to receive waterproofing.
B. Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions; vacuum substrate clean.
C. Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.
D. Fill nonmoving joints and cracks with a filler compatible with waterproofing materials.
E. Seal moving cracks with sealant and nonrigid filler, using procedures recommended by sealant and waterproofing manufacturers.
F. Prepare building expansion joints at locations as indicated on drawings.
G. Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer, and protect conditioner from rain or frost until dry.
H. Concrete Surfaces for Adhesive Bonding: Prepare concrete substrate in accordance with ASTM D5295/D5295M.
    1. Remove substances that inhibit adhesion including form release agents, curing compounds admixtures, laitance, moisture, dust, dirt, grease and oil.
    2. Repair surface defects including honeycombs, fins, tie holes, bug holes, sharp offsets, rutted cracks, ragged corners, deviations in surface plane, spalling and delaminations, as described in reference standard.
    3. Remove and replace areas of defective concrete; see Section 03 30 00.
    4. Prepare concrete for adhesive bonded waterproofing using mechanical or chemical methods described in referenced standard.
    5. Test concrete surfaces as described in referenced standards, and verify surfaces are ready to receive adhesive bonded waterproofing membrane system.

3.03 INSTALLATION - MEMBRANE

A. Install membrane waterproofing in accordance with manufacturer's instructions and NRCA (WM) applicable requirements.
B. Roll out membrane, and minimize wrinkles and bubbles.
C. Self-Adhering Membrane: Remove release paper layer, and roll out onto substrate with a mechanical roller to provide full contact bond.
D. Overlap edges and ends, minimum 3 inches (76 mm), seal permanently waterproof by method recommended by manufacturer, and apply uniform bead of sealant to joint edge.
E. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.
F. Weather lap joints on sloped substrate in direction of drainage, and seal joints and seams.
G. Install building expansion joints at locations as indicated on drawings.

H. Flexible Flashings: Seal items watertight that penetrate through waterproofing membrane with flexible flashings.
I. Seal membrane and flashings to adjoining surfaces.
    1. Install termination bar along edges.
    2. Install counterflashing over exposed edges.

3.04 INSTALLATION - DRAINAGE PANEL AND PROTECTION BOARD

A. Place drainage panel directly against membrane, butt joints, place to encourage drainage downward; scribe and cut boards around projections, penetrations, and interruptions.
B. Place protection board directly against drainage panel; butt joints, and scribe and cut boards around projections, penetrations, and interruptions.
C. Adhere protection board to substrate with compatible adhesive.

3.05 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

3.06 PROTECTION

A. Do not permit traffic over unprotected or uncovered membrane.

END OF SECTION 07 13 00

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SECTION 07 21 00
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board insulation at cavity wall construction, cavity wall construction, perimeter foundation wall, perimeter foundation wall, underside of floor slabs, underside of floor slabs, exterior wall behind _____ wall finish, and exterior wall behind metal panel wall finish.
B. Batt insulation in exterior wall and wall construction.
C. Acoustical insulation in interior partitions.
D. Batt insulation for filling fire-rated assemlies.

1.02 RELATED REQUIREMENTS

A. Section 07 25 00 - Weather Barriers : Separate air barrier materials.
B. Section 07 21 29 - Sprayed Acoustical Insulation: Sprayed-on, adhered fibrous insulation.
C. Section 07 26 40 - Spray Polyurethane Foam Insulating Air Barrier : Sprayed thermal insulation and air barrier.
D. Section 07 53 00 - Elastomeric Membrane Roofing: Insulation specified as part of roofing system.
E. Section 07 84 00 - Firestopping: Insulation as part of fire-rated through-penetration assemblies.

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.
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 2013 (Reapproved 2019).
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 2014 (Reapproved 2019).
F. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2023.
G. ASTM C726 - Standard Specification for Mineral Wool Roof Insulation Board 2017.

H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023c.
I. ASTM F2169 - Standard Specification for Resilient Stair Treads 2015 (Reapproved 2020).
J. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components 2023.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
B. Product Data: Provide data on product characteristics, performance criteria, product limitations, and other relevant data.
C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
D. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

1.06 QUALITY ASSURANCE

A. Thermal Resistivity: Where thermal resistivity properties of insulation materials are designated by r-values, they represent the rate of heat flow through a homogenous material exactly 1" thick, measured by test method included in referenced material standard or otherwise indicated. They are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperature indicated.
B. Fire Performance Characteristics: Provide insulation materials which are identical to those whose fire performance characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, per methods indicated below, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.
    1. Surface Burning Characteristics: ASTM E 84.
    2. Fire Resistance Ratings: ASTM E 119.
    3. Combustion Characteristics: ASTM E 136.
C. Protect plastic insulation as follows:
    1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
    2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
    3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction

PART 2 PRODUCTS

2.01 INSULATION TYPES

A. General
    1. The categorizations of thermal barriers by location, form, and application in this Article are general descriptions only. Refer to the Drawings and other Sections for specific requirements.
B. Type 1: Mineral fiber batt insulation with no vapor retarder.
    1. Application: Thermal insulation.
    2. Location: Stud cavities of exterior metal-framed walls.
C. Type 2: (NOT USED)
D. Type 3: Extruded polystyrene (XPS)
    1. Application: Thermal insulation.
    2. Location: Perimeter of Foundation, Under Concrete Slabs.

E. Type 4: (NOT USED)
F. Type 4A: Mineral fiber board.
   1. Application: Thermal insulation.
   2. Location: Exterior cavity walls behind finishes other than masonry veneer and as indicated.
G. Type 5: Mineral fiber batt insulation with no vapor retarder.
   1. Application: Acoustical insulation.
   2. Location: Stud cavities of sound-rated partitions.
H. Type 6: Mineral fiber batts.
   1. Application: Fire safing insulation.
   2. Location:
      a. In voids and penetrations of fire separations and smoke walls.
      b. At terminations of rated CMU partitions to deck above.
      c. At perimeter
   3. Form: Batts or blankets.
I. Type 7: Spray Polyurethane Foam
   1. Application: Thermal insulation.
   2. Location: Exterior cavity walls behind masonry veneer.
   3. See Section 07 26 40 - Spray Polyurethane Foam Insulating Air Barrier.

2.02 FOAM BOARD INSULATION MATERIALS

A. Type 3: Extruded Polystyrene (XPS) Board Insulation: Comply with ASTM C578 with either natural skin or cut cell surfaces.
   1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   3. Type and Thermal Resistance, R-value (RSI-value): Type VI, 5.0 (0.88), minimum, per 1 inch (25.4 mm) thickness at 75 degrees F (24 degrees C) mean temperature.
   4. Board Edges: Square.
   5. Type and Water Absorption: Type VI, 0.3 percent by volume, maximum, by total immersion.
   6. Products:
      a. DuPont de Nemours, Inc; Styrofoam Brand Highload 40: building.dupont.com/#sle.
      b. Dow Chemical Company; Highload 40: www.dow.com.
      c. Owens Corning Corporation; FOAMULAR Type 400 Extruded Polystyrene (XPS) Insulation: www.ocbuildingspec.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 MINERAL FIBER BOARD INSULATION MATERIALS

A. Type 4A: Mineral Wool Block or Board Thermal Insulation: Complying with ASTM C612, Type IVB.
   1. Flame Spread Index: 0 (zero), when tested in accordance with ASTM E84.
   2. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
   3. Board Size: 16 by 48 inches (405 by 1220 mm).
   4. Board Thickness: 2-1/2 inches (64 mm).
   5. Thermal Resistance: R-value (RSI-value) of 4.3 (0.76) per inch at 75 degrees F (24 C), minimum, when tested in accordance with ASTM C518.
   6. Density: 6.2 pcf (___ kg/cu m), nominal, outer layer; 3.8 pcf, nominal, inner layer;.
   7. Water vapor permeance: 27.2 perm per ASTM E 96.
   8. Products:
      a. ROCKWOOL; CAVITYROCK: www.rockwool.com/#sle.
      b. Thermafiber, Inc; RainBarrier HD: www.thermafiber.com/#sle.

9. Substitutions: See Section 01 60 00 - Product Requirements See Section 01 60 00 - Product Requirements.

B. Type 6: Mineral Wool Block, Board, or Blanket Fire Safing Insulation: Complying with ASTM C612 or ASTM C553.
   1. Flame Spread Index: 0 (zero), when tested in accordance with ASTM E84.
   2. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
   3. Products:
      a. Johns Manville; MinWool Safing: www.jm.com/#sle.
      b. Johns Manville; MinWool ___ Curtainwall ; MinWool 40 Curtainwall: www.jm.com/#sle.
      c. ROCKWOOL; CURTAINROCK 40: www.rockwool.com/#sle.
      d. ROCKWOOL; ROXUL SAFE: www.rockwool.com/#sle.
      e. Thermafiber, Inc; FireSpan 40: www.thermafiber.com/#sle.
      f. Thermafiber, Inc; Safing: www.thermafiber.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 MINERAL FIBER BLANKET INSULATION MATERIALS

A. Type 1: Mineral Wool Blanket Thermal Insulation: Flexible or semi-rigid preformed insulation, complying with ASTM C665.
   1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
   2. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
   3. Thermal Resistance: R-value (RSI-value) of 4.0 per inch (____).
   4. Products:
      a. Johns Manville; Mineral Wool TempControl Batts: www.jm.com/#sle.
      b. ROCKWOOL; COMFORTBATT: www.rockwool.com/#sle.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

B. Type 5: Mineral Wool Blanket Acoustical Insulation: Flexible or semi-rigid preformed insulation, complying with ASTM C665.
   1. Flame Spread Index: 0 (zero), when tested in accordance with ASTM E84.
   2. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
   3. Board Size: 16 by 48 inches (405 by 1220 mm).
   4. Thickness: As shown.
   5. Density: 6.2 pcf (99.3 kg/cu m), nominal.
   6. Products:
      a. Johns Manville; MinWool Sound Attenuation Fire Batts ; MinWool Sound Attenuation Fire Batts: www.jm.com/#sle.
      b. ROCKWOOL; AFB: www.rockwool.com/#sle.
      c. Thermafiber, Inc; SAFB: www.thermafiber.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements See Section 01 60 00 - Product Requirements.

2.05 ACCESSORIES

A. Tape joints of rigid insulation in accordance with insulation manufacturers' instructions.

B. Insulation Fasteners: Impaling clip of galvanized steel with washer retainer and clips and clips, to be mechanically fastened to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

C. Adhesive: Type recommended by insulation manufacturer for application. See Section 07 25 00 for insulation compatible with air barriers.

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 and adhesive.
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.

3.03 BOARD INSTALLATION AT EXTERIOR WALLS

A. Install boards horizontally on walls.
    1. Install in running bond pattern.
    2. Butt edges and ends tightly to adjacent boards and protrusions.
B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.04 BOARD INSTALLATION AT CAVITY WALLS

A. Secure impale fasteners to substrate at following frequency:
    1. Six (6) per insulation board.
B. Install boards to fit snugly between wall ties.
C. Install boards horizontally on walls.
    1. Butt edges and ends tightly to adjacent boards and protrusions.
    2. Place impale fastener locking discs.
D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.05 BOARD INSTALLATION UNDER CONCRETE SLABS

A. Place insulation under slabs on grade after base for slab has been compacted.
B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.06 BATT INSTALLATION

A. Install insulation in accordance with manufacturer's instructions.
B. Install in exterior wall 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.

3.07 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION 07 21 00

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SECTION 07 21 29 - SPRAYED ACOUSTICAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Cellulose insulation applied to underside of structure.

1.02 REFERENCE STANDARDS

A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2015.

B. ASTM C739 - Standard Specification for Cellulosic Fiber Loose-Fill Thermal Insulation; 2011.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.

1.03 SUBMITTALS

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

B. Product Data: Provide data on materials, describing insulation properties.

C. Certificates: Certify that products of this section meet or exceed specified requirements.

D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

E. Manufacturer's Qualification Statement.

F. Submit manufacturer's written certification that product contains no asbestos, fiberglass or other man-made mineral fibers.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section and approved by manufacturer.

1.05 MOCK-UP

A. Provide room mock-up, 10 feet long by 10 feet wide minimum, illustrating ceiling construction.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver in original, unopened containers bearing name of manufacturer, product identification and reference to U.L. testing.

B. Store materials dry, off ground, and under cover.

C. Protect liquid adhesive from freezing.

1.07 FIELD CONDITIONS

A. Maintain acceptable ambient and substrate surface temperatures prior to, during, and after installation of primer and insulation materials and overcoat.

B. Clips, hangers, supports, sleeves and other attachments to spray bases are to be placed by other trades prior to the application of sprayed insulation.

C. Ducts, piping, conduit or other suspended equipment shall not be positioned until after the application of sprayed insulation.

D. Roof penetrations to be installed prior to application.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Cellulosic Fiber Sprayed Insulation:
   1. International Cellulose Corp; K-13 Spray-On-Systems: www.spray-on.com.
   2. Isolatek International, Cafco Heat-Shield: www.isolatek.com.
   3. Substitutions: See Section 016000 - Product Requirements.

2.02 MATERIALS

A. Cellulose Fiber Insulation: ASTM C739; treated cellulose fiber, color as selected from manufacturers standard range.
   1. Thickness: 2 inches, unless otherwise noted.
   2. Acoustical performance: NRC of 0.95 (ASTM C 423)

B. Material to have been tested in accordance with ASTM E 1042. Testing laboratory must be NVLAP accredited.

C. Product shall meet or exceed the following requirements:
   1. Bond strength shall be greater than 100 psf per ASTM E 736.
   2. Product shall be Class 1 Class A per ASTM E 84/ UL 723.
   3. Non-corrosive per ASTM C 739.
   4. Bond Deflection per ASTM E 759: 6” Deflection in 10’ Span - No Spalling or Delamination.
   5. R-Value to be 3.75 per inch per ASTM C518.
   6. Comply with IBC 803.3/2009 IBC 803.10 stability requirements for interior finishes.
   7. Meet ASTM C 1149

D. Product shall not contain any added Urea-Formaldehyde Resins.

2.03 ACCESSORIES

A. Primer: As required by insulation manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are clean, dry, and free of matter that may inhibit adhesion.

B. Verify that ceiling hangers and supporting clips have been are installed correctly.

C. Verify other work on and within spaces to be insulated is complete prior to application.

3.02 PREPARATION

A. Mask and protect adjacent surfaces from overspray or damage.

B. Apply primer in accordance with manufacturer's instructions.

3.03 INSTALLATION

A. Install sprayed insulation in accordance with manufacturer's instructions.

B. Install sprayed insulation to a uniform monolithic density without voids.

C. Install to a minimum cured thickness of 2 inches.

3.04 PROTECTION

A. Do not permit subsequent construction work to disturb applied sprayed insulation.

END OF SECTION

SECTION 07 25 00
WEATHER BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Air Barriers: Materials that form a system to stop passage of air through exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls.

1.02 RELATED REQUIREMENTS

A. Section 07 26 00 - Under-Slab Vapor Barrier
B. Section 07 26 40 - Spray Polyurethane Foam Insulating Air Barrier: Insulation and air barrier in exterior walls.
C. Section 07 62 00 - Sheet Metal Flashing and Trim: Flashings installed in conjunction with air barriers.
D. Section 07 92 00 - Joint Sealants: Sealing building expansion joints.

1.03 DEFINITIONS

A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.
C. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
    1. Water Vapor Permeance: For purposes of conversion, 57.2 ng/(Pa s sq m) = 1 perm.
D. Water-Resistive Barrier: Water-shedding barrier made of material that is moisture-resistant, to the degree specified, intended to be installed to shed water, with sealed seams.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on material characteristics.
C. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.
D. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.
E. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
F. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification; keep copies of each contractor accreditation and installer certification on site during and after installation, and present on-site documentation upon request.

1.05 QUALITY ASSURANCE

A. 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, and use secondary materials approved in writing by primary material manufacturer.

1.06 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

PART 2 PRODUCTS

2.01 WEATHER BARRIER ASSEMBLIES

A. Air Barrier:

1. On outside surface of gypsum sheathing of exterior walls where Spray Polyurethane Foam Insulating Air Barrier is not indicated, use air barrier sheet, self-adhesive type.

2.02 AIR BARRIER MATERIALS (AIR BARRIER, VAPOR PERMEABLE, AND WATER-RESISTIVE)

A. Air Barrier Sheet (Walls): ASTM D1970.

1. Type: Self-adhered vapor permeable, water resistive air barrier consisting of a reinforced, modified polyolefin tri-laminate film surface and patented permeable adhesive technology with split-back poly-release film.
2. Thickness: 23 mil (___ mm), nominal.
3. Water Vapor Permeance: 29 perm (___ ng/(Pa s sq m)), maximum, when tested in accordance with ASTM E96/E96M.
4. Air Permeance: Pass (0.02 L/s/sq m), maximum, when tested in accordance with ASTM E2178.
5. Manufacturers:
   a. Henry Company; Blueskin VP 160: www.henry.com/sle..
   b. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 SEALANTS

A. Primers, Cleaners, and Other Sealant Materials: As recommended by sealant manufacturer, appropriate to application, and compatible with adjacent materials.

2.04 ADHESIVES

A. Mastic Adhesive : Compatible with sheet seal and substrate, thick mastic of uniform knife grade consistency .

2.05 ACCESSORIES

A. Transition Membrane: Self-adhering, smooth surfaced SBS modified bitumen membrane, nominal 40 mil thickness, width as required, to detail all rough openings, changes in material substrates, and penetrations.
   1. Blueskin SA as manufactured by Henry Company Inc
B. Sheet Membrane Transition Strip Termination Sealant:
   1. BES 925 Sealant by Henry Company Inc
C. Primer: Water based liquid primer for concrete, masonry, gypsum sheathing, wood, metal, and painted substrates;
   1. Aquatac as manufactured by Henry Company Inc.
D. Thinners and Cleaners: As recommended by material manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and conditions are ready to accept the work of this section.

3.02 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's instructions.

3.03 INSTALLATION

A. Install materials in accordance with manufacturer's instructions.
B. Water-Resistive Barriers: Install continuous barrier over surfaces indicated, with sheets lapped to shed water and with sealed seams and with sealed joints to adjacent surfaces.
C. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
D. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.
E. Self-Adhered Sheets:
    1. Prepare substrate in manner recommended by sheet manufacturer; fill and tape joints in substrate and between dissimilar materials.
    2. Lap sheets shingle-fashion to shed water and seal laps air tight.
    3. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.
    4. Use same material, or other material approved by sheet manufacturer for the purpose, to seal to adjacent construction and as flashing.
    5. At wide joints, provide extra flexible membrane allowing joint movement.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.
B. Coordination of ABAA Tests and Inspections:
    1. Provide testing and inspection required by ABAA 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.
C. Do not cover installed weather barriers until required inspections have been completed.
D. Obtain approval of installation procedures by the weather barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.

3.05 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION 07 25 00

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SECTION 07 26 00
UNDER-SLAB VAPOR BARRIER

PART 1 – GENERAL

1.01 SUMMARY

A. Products supplied under this section:
   1. Vapor barrier and installation accessories for installation under concrete slabs.
B. Related sections:
   1. Section 03 30 00 Cast-in-Place Concrete

1.02 REFERENCES

A. ASTM International:
   1. ASTM E1745-17 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
   2. ASTM E1643-18a Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
B. Technical Reference - American Concrete Institute (ACI):
   1. ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.
   2. ACI 302.1R-15 Guide to Concrete Floor and Slab Construction.
C. SUBMITTALS
D. Quality control/assurance:
   1. Summary of test results per paragraph 9.3 of ASTM E1745.
   2. Manufacturer's samples and literature.
   3. Manufacturer's installation instructions for placement, seaming, penetration prevention and repair, and perimeter seal per ASTM E1643.
   4. All mandatory ASTM E1745 testing must be performed on a single production roll per ASTM E1745 Section 8.1.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Vapor barrier shall have the following qualities:
   1. Maintain permeance of less than 0.01 Perms [grains/(ft2 · hr · inHg)] as tested in accordance with mandatory conditioning tests per ASTM E1745 Section 7.1 (7.1.1-7.1.5).
   2. Other performance criteria:
      a. Strength: ASTM E1745 Class A.
      b. Thickness: 20 mils minimum
   3. Provide third party documentation that all testing was performed on a single production roll per ASTM E1745 Section 8.1
B. Vapor barrier products:
   1. Basis of Design: Stego Wrap 20-Mil Vapor Barrier by Stego Industries LLC., (877) 464-7834 www.stegoindustries.com.
   2. Substitutions: See Section 01 6000 – Product Requirements.

2.02 ACCESSORIES

A. Seams: Stego Tape by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
B. Sealing Penetrations of Vapor barrier:
   1. Stego Mastic by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
   2. Stego Tape by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.
C. Perimeter/edge seal:

1. StegoTack Tape (double-sided sealant tape) by Stego Industries LLC, (877) 464-7834
2. Stego Term Bar by Stego Industries LLC, (877) 464-7834 www.stegoindustries.com.

PART 3 – EXECUTION

3.01 PREPARATION

A. Ensure that subsoil is approved by Architect or Geotechnical Engineer.
   1. Level and compact base material.

INSTALLATION

A. Install vapor barrier in accordance ASTM E1643.
   a. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.
   2. Extend vapor barrier to the perimeter of the slab. If practicable, terminate it at the top of the slab, otherwise (a) at a point acceptable to the structural engineer or (b) where obstructed by impediments, such as dowels, waterstops, or any other site condition requiring early termination of the vapor barrier. At the point of termination, seal vapor barrier to the foundation wall, grade beam or slab itself.
      a. Seal vapor barrier to the entire perimeter wall or footing/grade beam with double sided StegoTack Tape, per manufacturer's instructions. Ensure the concrete is clean and dry prior to adhering tape.
   3. Overlap joints 6 inches and seal with manufacturer's seam tape.
   4. Seal all penetrations (including pipes) per manufacturer's instructions.
   5. Repair damaged areas with vapor barrier material of similar (or better) permeance, puncture and tensile.

END OF SECTION 07 26 00

SECTION 07 26 40
SPRAY POLYURETHANE FOAM INSULATING AIR BARRIER

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. This section includes the following:
   1. Materials and installation to bridge and seal the following air leakage pathways and gaps:
      a. Connections of the walls to the roof air barrier.
      b. Connections of the walls to the foundations.
      c. Openings and penetrations of window frames.
      d. Barrier envelope systems.
      e. Door frames.
      f. Piping, conduit, duct and similar penetrations
      g. Masonry ties, screws, bolts and similar penetrations.
      h. All other air leakage pathways in the building envelope.

1.02 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION

A. Sheet metal flashings to be built into masonry are furnished under Section 07 62 00.

1.03 RELATED SECTIONS

A. Section 04 20 00 - Unit Masonry:
   1. Masonry backup walls
   2. Masonry veneer cavity walls.
B. Section 07 21 00 - Thermal Insulation : Other building Insulation.
C. Section 07 92 00 - Joint Sealants : Joint sealant materials and installation.
D. Section 08 11 13- Hollow Metal Door frames.
E. Section 08 43 13 Aluminum Storefronts and Entrances
F. Section 08 44 13 - Glazed Aluminum Curtain Walls

1.04 PERFORMANCE REQUIREMENTS

A. Provide air/vapor barrier system constructed to perform as follows:
   1. A continuous air/vapor barrier system.
   2. Building thermal insulation.
B. System shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air seal materials at such locations, changes in substrate and perimeter conditions.
C. Maximum Permissible Air Leakage Rates cfm/sf @ 0.3" w.g. (l/s.m2 @ 75 Pa)

1.05 SUBMITTALS

A. Provide submittals in accordance with Section 013000.
B. Submit shop drawings showing locations and extent of air/vapor barrier and details of all typical conditions, intersections with other envelope systems and materials, membrane flashings and counter-flashings, and details showing how gaps in the construction will be bridged, how inside and outside corners are negotiated and how miscellaneous penetrations such as conduits, pipes electric boxes and the like are sealed.
C. Submit manufacturer's product data sheets for each type of material, including manufacturer's printed instructions for evaluating, preparing, and treating substrate, temperature and other limitations of installation conditions, technical data, and tested physical and performance properties.
D. Submit manufacturer's installation instructions.

E. Provide evidence of testing by an accredited laboratory confirming material has been tested and conforms to the requirements of ASTM E2178, Standard for Air Barrier Materials.
F. Certification by air/vapor barrier manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
G. Certification of compatibility by air/vapor barrier manufacturer, listing all materials on the project that it connects to or that come in contact with it.
H. Submit two samples, 12 by 12 inch (300 by 300 mm) minimum size, of each air/vapor barrier material required for Project.
I. Submit test results of air permeability testing of primary air barrier material (ASTM E 2178-01).
J. Provide evidence of testing by an accredited laboratory confirming material has been tested and conforms to the requirements of ASTM E2357, Standard Test Method for Determining Air Leakage of Air Barrier Assemblies: Pass.
K. Provide evidence of testing by an accredited laboratory confirming material has been tested and conforms to the requirements of NFPA 285: Pass.
L. Quality Assurance Program: Submit evidence of current accreditation and certification under the Air Barrier Association of America's (ABAA) Quality Assurance Program. Submit accreditation number of manufacturer and certification number of installers at time of submittal.

1.06 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Each worker who is installing air barriers must be either a Certified Applicator or an installer who is registered with ABAA
   2. Each Lead Certified Applicator can supervise a maximum of five registered installers. The Certified Applicator shall be thoroughly trained and experienced in the installation of air barriers of the types being applied. Lead Certified Applicators shall perform or directly supervise all air/vapor barrier work on the project.
   3. Installers shall also be certified by ABAA/NECA (National Energy Conservation Association) and PSDI (Professional Skills Development Institute for energy conservation) and SPFA (Spray Polyurethane Foam Alliance as foam mechanics). Installers shall have their photo-identification certification cards in their possession and available on the project site, for inspection upon request.
   4. Provide products that comply with all state and local regulations controlling use of volatile organic compounds (VOCs).
   5. Preconstruction Meeting: Convene one week prior to commencing Work of this section, in accordance with Section 01 20 00 - Project Meetings.
   6. Field-Constructed Mock-Ups: Prior to installation of air/vapor barrier, apply air/vapor barrier as follows to verify details under shop drawing submittals and to demonstrate tie-ins with adjoining construction, and other termination conditions, as well as qualities of materials and execution:
      a. Apply air/vapor barrier in field-constructed mock-ups of assemblies specified in Section 04 20 00.
   7. Cooperate and coordinate with the Owner's inspection and testing agency if required. Do not cover any installed air and vapor barrier unless it has been inspected, tested and approved per requirements.
   8. Protect people and materials from over-spray and contact with chemicals and gases.

1.07 FIELD QUALITY ASSURANCE

A. Implement the ABAA Quality Assurance Program requirements. Cooperate with ABAA inspectors and independent testing and inspection agencies engaged by the Owner. Do not

cover air barrier until it has been inspected, tested, and accepted.

1.08 MOCKUP

A. Provide spray polyurethane foam insulating air barrier as part of exterior wall assembly mockup. See Section 04 20 00 and Drawings for requirements.
B. See Section 01 40 00 - Quality Requirements for additional requirements.
C. Locate where directed.
D. Mock-up may not remain as part of the Work.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product, date of manufacture, expiration date, and directions for storage.
B. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by air/vapor barrier manufacturer. Protect stored materials from direct sunlight.
C. Avoid spillage. Immediately notify Owner, Architect if spillage occurs and start clean up procedures.
D. Clean spills and leave area as it was prior to spill.

1.10 WASTE MANAGEMENT AND DISPOSAL

A. Place materials defined as hazardous or toxic waste in designated containers.
B. Ensure emptied containers are sealed and stored safely for disposal.

1.11 PROJECT CONDITIONS

A. Environmental Conditions: Apply air/vapor barrier within range of ambient and substrate temperatures recommended by air/vapor barrier manufacturer. Do not apply air/vapor barrier to a damp or wet substrate, unless the manufacturer specifically permits that for the product.
    1. Do not apply air/vapor barrier in snow, rain, fog, or mist.
    2. Do not apply air/vapor barrier when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the manufacturer.
    3. The product shall not be installed after the expiry date printed on the label of each container. The product has a shelf life of 6 months from the date of manufacture.

1.12 WARRANTY

A. System Warranty: Provide the manufacturer's three year system warranty, including the primary air/vapor barrier and installed accessory sealant and membrane materials which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 - PRODUCTS

2.01 MATERIALS & MANUFACTURERS

A. Sprayed polyurethane foam material, when tested, shall meet the requirements of ULC S705.1-01 Standard for Thermal Insulation-Spray Applied Rigid Polyurethane Foam, Medium Density, Material- Specification.
B. A copy of an Evaluation Report (such as the CCMC Evaluation Report) or copies of the test reports from an accredited testing laboratory, for each physical property, indicating that the product meets the requirements of ULC S705.1-01 shall be made available upon request.
C. Material containers shall be labeled with the Evaluation Report number of the evaluation agency.
D. Design R-value as indicated in test report; minimum R6.9/inch.

E. Density as indicated in test report: minimum 1.7 pounds per cubic foot.
F. Smoke development as indicated in test report; less than 500 when tested under ULC S102.
G. Products that meet the preceding requirements:
    1. Basis-of-design product: Walltite closed cell spray foam polyurethane air/vapor barrier as manufactured by BASF (215-966-1168).
H. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of another manufacturer with approved submittal meeting the design criteria:
    1. Icynene: www.icynene.com
I. Substitutions: See Section 01 60 00 - Product Requirements.
    1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

2.02 AUXILIARY MATERIALS

A. Furnish auxiliary materials recommended by air/vapor barrier manufacturer for intended use and compatible with the air/vapor barrier.
B. Transition Membrane: Self-adhering, smooth surfaced SBS modified bitumen membrane, nominal 40 mil thickness, width as required, to detail all rough openings, changes in material substrates, and penetrations.
    1. Blueskin SA as manufactured by Henry Company Inc
    2. Butyl-based peel and stick membrane: Transition between air/vapor barrier membrane and TPO or EPDM membranes:
        a. Blueskin SA as manufactured by Henry Company Inc.
    3. Primer: Water based liquid primer for concrete, masonry, gypsum sheathing, wood, metal, and painted substrates;
        a. Aquatac as manufactured by Henry Company Inc.
    4. Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes approved by foamed in place air/vapor barrier manufacturer.
    5. Sheet Membrane Transition Strip Termination Sealant:
        a. BES 925 Sealant by Henry Company Inc.
    6. Sheet Membrane Sheet Membrane Air Barrier Perimeter Seal to Windows, Doors: Low modulus silicone sheet; provide manufacturer's standard system consisting of precured low-modulus silicone extrusion, in sizes to fit widths indicated, combined with a neutral-curing low modulus silicone sealant for bonding extrusions to substrates.
        a. Pecora Sil-Span.
        b. Dow 1-2-3 or equal.
    7. Provide sealants in accordance with Section 079200 - Joint Sealants. Comply with ASTM C920 and ASTM C920 classifications for type, grade, class, and uses.
        a. Silicone Sealant: natural cure, low modulus, to seal sheet membrane flashing to polyethylene face of sheet rubberized-asphalt barrier and to seal between and to non-bituminous sheet systems.
            1) Acceptable materials:
                (a) Dow 790
                (b) Pecora 864
        b. SPF (Sprayed Polyurethane Foam) Sealant: Provide one- or two-component, foamed-in-place, polyurethane foam sealant with the following characteristics:
            1) Density: 1.5 to 2.0 PCF.
            2) Flame Spread (ASTM E162): 25 or less.
            3) Initial R-Value (at 1 inch): Not less than 7.
            4) Acceptable materials:

(a) Zerodraft Foam Sealant.
(b) Zerodraft Insulating Air Sealant

5) Zerodraft (Division of Canam Building Envelope Specialists Inc.), 125 Traders Blvd. E., Unit # 4, Mississauga, ON, L4Z 2H3 Tel. 1-877-272-2626

c. Substrate Cleaner: Non-corrosive compatible with adjacent materials.

C. Intumescent Coating
1. Intumescent Coating: ICP Construction Fireshell F10E
2. Topcoat: Fireshell F1
3. Substitutions: Equivalent coatings and topcoats are acceptable contingent upon NFPA 285 testing reports using project-specific wall system assembly components. Submit in accordance with Section 01 60 00 - Product Requirements .

2.03 EQUIPMENT

A. The equipment used to spray the polyurethane foam material shall be in accordance with ULC S705.2-02 and the equipment manufacturer's recommendations for specific type of application.

B. Equipment settings are to be recorded on the Daily Work Record as required by the ULC S705.2-02 Installation standard.

C. Each proportioner unit to supply only one spray gun.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions under which air/vapor barrier systems will be applied, with Installer present, for compliance with requirements. Verify that surfaces and conditions are suitable prior to commencing work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Ensure that:
1. surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants
2. concrete surfaces are cured and dry, smooth without large voids, spalled areas or sharp protrusions.
3. masonry joints are flush and completely filled with mortar, and all excess mortar sitting on masonry ties has been removed.
4. Verify substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D4263.
5. Notify Architect in writing of anticipated problems using air/vapor barrier over substrate.

3.02 SURFACE PREPARATION

A. Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air/vapor barrier application.

B. Prime ICBP metal substrates with conditioning primer when installing modified asphalt membrane transition membranes.

C. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through air/vapor barrier and at protrusions according to air/vapor barrier manufacturer's written instructions.
1. Verify that surfaces and conditions are suitable to accept work as outlined in this section.
2. Commencement of work outlined in this section shall be deemed as acceptance of existing work and conditions.
3. Examine joints before sealing to ensure configurations, surfaces and widths are suitable for spray polyurethane foam. Report in writing all defects stating the locations of joints

deemed unacceptable for the application of the spray polyurethane foam.

3.03 PREPARATION

A. Protection:
   1. Mask and cover adjacent areas to protect from over spray.
   2. Ensure any required foam stop or back up material are in place to prevent over spray and achieve complete seal.
   3. Seal off existing ventilation equipment. Install temporary ducting and fans to ensure exhaust fumes. Provide for make-up air.
   4. Erect barriers, isolate area and post warning signs to advise non-protected personnel to avoid the spray area.
   5. Surface Preparation
      a. Surfaces to receive foam insulation shall be clean, dry and properly fastened to ensure adhesion of the polyurethane foam to the substrate.
      b. Ensure that all work by other trades that may penetrate through the air barrier system is in place and complete.
      c. Ensure that surface preparation and any primers required conform to the manufacturer's instructions.
      d. Prepare surfaces by brushing, scrubbing. Scraping, or grinding to remove loose mortar, dust, oil, grease, oxidation, mill scale and other contaminants which will affect adhesion and integrity of the spray polyurethane foam. Wipe down metal surfaces to remove release agents or other non-compatible coatings, using clean sponges or rags soaked in a solvent compatible with the spray polyurethane foam. Ensure surfaces are dry before proceeding.
      e. Install transition membranes around and into all rough openings, to all materials penetrating the exterior wall to all applicable surfaces and ensure proper adhesion of the transition membranes to the substrate, capable of having spray polyurethane foam insulation.
      f. Install counter-flashings:
         1) Metal: Mechanically fasten metal counter-flashings with screws at 8” (200 mm) o.c.
         2) Membrane: Cut into and uncover only 3” of siliconized release paper along one edge of the counter-flashing membrane. Adhere membrane flashing to the pre-primed substrate a minimum of 3” and roll firmly in place.
      g. Ensure veneer anchors are in place.

3.04 APPLICATION

A. Spray-application of polyurethane foam shall be installed in accordance with ULC S705.2-02 and the manufacturer's instructions.
B. Apply only when surfaces and environmental conditions are within limits prescribed by the material manufacturer and the ULC S705.2 Installation standard.
C. Apply in consecutive passes as recommended by manufacturer to thickness as indicated on drawings. Passes shall be not less than ½ inch and not greater than 2 inches.
D. Do not install spray polyurethane foam within 3 inches of heat emitting devices such as light fixtures and chimneys.
E. Finished surface of foam insulation to be free of voids and embedded foreign objects.
F. Remove masking materials and over spray from adjacent areas immediately after foam surface has hardened. Ensure cleaning methods do not damage work performed by other sections.
G. Trim, as required, any excess thickness that would interfere with the application of cladding/covering system by other trades.

H. Clean and restore surfaces soiled or damaged by work of the section. Consult with section of work soiled before cleaning to ensure methods used will not damage the work.
I. Do not permit adjacent work to be damaged by work of this section. Damage to work of this section caused by other sections shall be repaired by this section at the expense of the subcontractor causing the damage.
J. Complete connections to other components or repair any gaps, holes or other damage using material which conforms to ULC S710.1 Polyurethane Sealant Foam - One Component - Material or ULC S711.1 Polyurethane Sealant Foam - Two Components - Material and shall be installed in accordance with ULC S710.2 Polyurethane Sealant Foam - One component - Installation or ULC S711.2 Polyurethane Sealant Foam - Two Component - Installation, whichever is appropriate.
K. At all locations, install intumescent paint and topcoat to required wet or dry mil thickness or coverage rate in accordance with manufacturer's instructions, by brush, roller, conventional or airless spray.

3.05 TOLERANCES

A. Maximum variation from indicated thickness: minus (-) ¼ inch; plus (+) ½ inch.

3.06 PROTECTION

A. Cover the spray polyurethane foam with a thermal barrier when installed on the interior of the building.

END OF SECTION 07 26 40

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SECTION 07 42 13.13
METAL WALL AND ROOF PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exposed fastener metal wall and roof panels.

1.02 RELATED REQUIREMENTS

A. Section 07 62 00 - Sheet Metal Flashing and Trim : Sheet metal flashings, reglets and roof drainage items.
B. Section 07 71 00 - Roof Specialties : Copings and fascia that are not part of wall panel system.
C. Section 07 92 00 - Joint Sealants: Field-applied joint sealants.

1.03 REFERENCES

A. American Architectural Manufacturer's Association (AAMA):
   1. AAMA 620 - Voluntary Specification for High Performance Organic Coatings on Coil Coated Architectural Aluminum Substrates.
B. American Society of Civil Engineers (ASCE):
   1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
C. ASTM International (ASTM):
   1. ASTM A 653/A 653M - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   2. ASTM A 666 – Standard specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
   3. ASTM B 209 - Specification for Aluminum and Aluminum Alloy Sheet and Plate.
   4. ASTM C 754 - Specification for Installation of Steel Framing Members to Receive Screw Attached Gypsum Panel Products.
   5. ASTM C 920 - Specification for Elastomeric Joint Sealants.
   6. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
   7. ASTM E 283 - Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences across the Specimen.
   8. ASTM E 331 - Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
D. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA):
   1. Architectural Sheet Metal Manual.

1.04 PERFORMANCE REQUIREMENTS

A. General: Provide metal wall panel assemblies meeting performance requirements as determined by application of specified tests by a qualified testing agency on manufacturer's standard assemblies.
B. Air Infiltration: When installed over Insulated Composite Backup Panels or Metal Liner Panels, maximum 0.06 cfm/sq. ft. (0.3 L/s per sq. m) per ASTM E 283 at a static-air-pressure difference of 1.57 lbf/sq. ft. (75 Pa), using minimum 10-by-10 foot (3050-by-3050 mm) test panel that includes side joints.
C. Water Penetration, Static Pressure: When installed over Insulated Composite Backup Panels or Metal Liner Panels, no uncontrolled water penetration per ASTM E 331 at a minimum static differential pressure of 6.24 lbf/sq. ft. (299 Pa), using minimum 10-by-10 foot (3050-

by-3050 mm) test panel that includes side joints.

D. Maximum allowable deflection limitation.
   1. Single Skin Panels greater than 1-inch (25-mm) in Depth: Limited to L/120 deflection of panel perimeter normal to plane of wall.

E. Secondary Metal Framing: Design secondary metal framing for metal wall panel assembly according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions."

F. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction.

G. Wall systems that incorporate foam plastic insulation must be tested by the foam plastic supplier in accordance with NFPA-285.

1.05 QUALITY ASSURANCE

A. Manufacturer/Source: Provide metal wall panel and panel accessories from a single manufacturer.

B. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum 10 years experience in manufacture of similar products in successful use in similar applications.

C. Wall Systems Installer Qualifications: Experienced Installer with minimum of 5 years experience with successfully completed projects of a similar nature and scope.

1.06 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct preinstallation meeting at site attended by Owner, Architect, manufacturer's representative, and other trade contractors.
   1. Coordinate building framing in relation to metal wall panel assembly.
   2. Coordinate installation of building air and water barrier behind metal wall panel assembly.
   3. Coordinate window, door and louver, and other openings and penetrations of metal wall panel assembly.

1.07 ACTION SUBMITTALS

A. Product Data: Manufacturer’s data sheets, for specified products.
   1. Include data indicating compliance with performance requirements.

B. Shop Drawings: Provide shop drawings prepared by manufacturer or manufacturer's authorized Installer. Include full elevations showing openings and penetrations. Include details of each condition of installation and attachment. Provide details at a minimum scale 1-1/2-inch per foot (1:8) of all required trim and extrusions needed for a complete installation.
   1. Indicate points of supporting structure that must coordinate with metal wall panel assembly installation.

C. Samples for Initial Selection: For each product specified. Provide representative color charts of manufacturer's full range of colors.

D. Samples for Verification: Provide 12-inch (300 mm) section of panel(s) showing finishes. Provide 12-inch (300 mm) long pieces of trim pieces and other exposed components.

1.08 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Indicating compliance of products with requirements, from a qualified independent testing agency.

B. Qualification Information: For Installer firm.

C. Manufacturer's warranty: Submit sample warranty.

1.09 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Protect metal wall panel products during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage.
   1. Deliver, unload, store, and erect metal wall panel products and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.

1.11 WARRANTY

A. Special Manufacturer's Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace components of metal wall panel assemblies that fail in materials and workmanship within 10 years from date of Substantial Completion.
B. Special Panel Finish Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace metal wall panels that display evidence of deterioration of finish within 20 years from the date of substantial completion.

PART 2 PRODUCTS

2.01 SYSTEM DESCRIPTION

A. Metal Wall Panels over Outside-Insulated Framed Wall System: Single-skin exposed fastener metal wall panels applied as exterior rainscreen cladding over wall framing specified in Division 05 Section "Cold-Formed Metal Framing" with exterior sheathing specified in Division 09 Section "Gypsum Board Assemblies", an applied membrane that provides air, moisture, and water vapor control specified in Division 07 Section "Spray Polyurethane Foam Insulating Air Barriers", and insulation within the framing and applied outboard of the sheathing. Metal wall panel installation specified in this Section includes secondary metal subgirt framing for panel attachment.
   1. Air, moisture, and water vapor control membrane is provided under Division 07 Section "Spray Polyurethane Foam Insulating Air Barriers."
B. Metal Wall Panels over Masonry Wall System: Single-skin exposed fastener metal wall panels applied as exterior rainscreen cladding over a masonry wall specified in Division 04 Section "Unit Masonry" and an applied membrane that provides insulation and air, moisture, and water vapor control specified in Division 07 Section "Spray Polyurethane Foam Insulating Air Barriers." Metal wall panel installation specified in this Section includes secondary metal subgirt framing for panel attachment.
   1. Air, moisture, and water vapor control membrane is provided under Division 07 Section "Spray Polyurethane Foam Insulating Air Barriers."
C. Metal Roof Panels over Uninsulated Steel-Framed Framed Canopy: Single-skin exposed fastener metal roof panels applied as roof decking over steel framing specified in Division 05 Section "Structural Steel Fabrications" Metal roof panel installation specified in this Section may include secondary metal subgirt framing and gutters, trim and fascia.

2.02 MANUFACTURERS

A. Basis of Design: CENTRIA, Exposed Fastener Series Metal Wall and Roof Panels. Provide basis of design product, or comparable product approved by Architect prior to bid.
   1. CENTRIA Architectural Systems; Moon Township, PA 15108-2944. Tel: (800)759-7474. Tel: (412)299-8000. Fax: (412)299-8317. Email: info@CENTRIA.com. Web: www.CENTRIA.com.
   2. Substitutions: See Section 01 60 00 - Product Requirements .

2.03 METAL WALL AND ROOF PANEL MATERIALS

A. Aluminum Face Sheet: Smooth surface coil-coated, ASTM B 209, 3003-H14 or 5052-H32 alloy.
   1. Face Sheet: 0.050 inch (1.27 mm) nominal thickness.
   2. Surface: Smooth

2.04 EXPOSED FASTENER PROFILE METAL WALL AND ROOFPANELS

A. Metal Wall and Roof Panels, General: Factory-formed, Exposed fastener panels with interconnecting side joints, fastened to supports with exposed fasteners, with field-applied sealants in side laps when required to meet performance requirements.
B. Ribbed profile with lap joint:
   1. Basis of Design Product: CENTRIA, MR3-36.
   2. Panel Coverage: 36 inches (914 mm).
   3. Panel Height: 3.0 inches (76 mm).
   4. Rib Spacing: 3 at 12 inches (305 mm) o.c.
C. Exposed Coil-Coated Finish System:
   1. Fluoropolymer Three-Coat System: 0.8 mil primer with 0.8 mil 70 percent PVDF fluoropolymer color coat, and a 0.8 mil 70 percent PVDF fluoropolymer clear coat, AAMA 620.
      a. Basis of Design: CENTRIA Duragard Plus.
D. Color:
   1. Exterior Surface: As selected by Architect from manufacturer's standard colors.
   2. Interior Surface: As selected by Architect from manufacturer's standard colors.

2.05 METAL WALL PANEL ACCESSORIES

A. Metal Wall Panel Accessories, General: Provide complete metal wall panel assembly incorporating trim, copings, fasciae, parapet caps, soffits, sills, inside and outside corners, and miscellaneous flashings. Fabricate accessories in accordance with SMACNA Manual. Provide manufacturer's factory-formed clips, shims, flashings, gaskets, lap strips, closure strips, and caps for a complete installation as required for the following:
   1. Single-skin application over insulated, sheathed frame wall with air and water resistant barrier.
   2. Single-skin application over furred masonry backup with air and water resistant barrier.
   3. Multi-component wall system, consisting of metal wall panel application over insulated core metal wall panel backup system.
B. Extruded Trim: Manufacturer's complementary aluminum extrusions for head, jamb, sill, base, flush, reveal, inside and outside corner, end wall, and expansion joint details. Finish to match metal wall panels.
   1. Basis of Design: CENTRIA, Microline Extrusions.
C. Mitered Corners: Structurally-bonded horizontal interior and exterior trimless corners matching metal wall panel material, profile, and factory-applied finish, fabricated and finished by metal wall panel manufacturer.
   1. Welded, riveted, fastened, or field- fabricated corners do not meet the requirements of this specification.
   2. Basis of Design: CENTRIA, MicroSeam Corners.
D. Formed Flashing and Trim: Match material, thickness, and color of metal wall panel face sheets.
E. Sealants: Type recommended by metal wall panel manufacturer for application, meeting requirements of Division 07 Section "Joint Sealants."

F. Flashing Tape: 4-inch wide self-adhering butyl flashing tape.
G. Fasteners: Self-tapping screws, bolts, nuts, and other acceptable fasteners recommended by panel manufacturer. All exposed fasteners must be stainless steel with heads matching color of metal wall panels by means of factory-applied coating.

2.06 SECONDARY METAL FRAMING

A. Miscellaneous Framing Components, General: Cold-formed metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z180).
1. Hat Channels: 0.06 inch/16 ga. (1.52 mm) minimum – nominal thickness.
2. Sill Channels: 0.06 inch/16 ga. (1.52 mm) minimum – nominal thickness.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine metal wall panel substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal wall panels.
B. Wall Substrate: Confirm that wall substrate is within tolerances acceptable to metal wall panel system manufacturer.
1. Maximum deviations acceptable:
a. 1/4-inch in 20 feet (6.4 mm in 6 m) vertically or horizontally from face plane of framing.
b. 1/2-inch (12.7 mm) across building elevation.
c. 1/8-inch in 5 feet (3.2 mm in 1.5 m).
C. Framing: Inspect framing that will support metal wall panels to determine if support components are installed as indicated on approved shop drawings. Confirm presence of acceptable framing members at recommended spacing to match installation requirements of metal wall panels.
D. Openings: Verify that windows, doors, louvers and other penetrations match layout on shop drawings.
E. Air/Moisture Barriers: Confirm that work has been completed, inspected, and tested as required.
F. Advise G.C, in writing, of out-of-tolerance work and other deficient conditions prior to proceeding with metal wall panel system installation.
G. Correct out of tolerance work and other deficient conditions prior to panel installation.

3.02 SECONDARY FRAMING INSTALLATION

A. Secondary Metal Framing: Install secondary metal framing components to tolerances indicated, as shown on approved shop drawings. Install secondary metal framing and other metal panel supports per ASTM C 1007 and metal wall panel manufacturer's recommendations.

3.03 METAL WALL AND ROOF PANEL INSTALLATION

A. General: Install metal wall and roof panels in accordance with approved shop drawings and manufacturer's recommendations. Install metal wall and roof panels in orientation, sizes, and locations indicated. Anchor metal wall and roof panels and other components securely in place.
B. Attach panels to metal framing using recommended screws, fasteners, sealants, and adhesives indicated on approved shop drawings.
1. Fasteners for Steel Wall Panels: Stainless-steel for exterior locations and locations exposed to moisture; carbon steel for interior use only.
2. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.

3. Dissimilar Materials: Where elements of metal wall panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.

C. Joint Sealers: Install joint sealants where indicated on approved shop drawings.

3.04 ACCESSORY INSTALLATION

A. General: Install metal wall panel accessories with positive anchorage to building. Coordinate installation with flashings and other components.
1. Install related flashings and sheet metal trim per requirements of Division 07 Section "Sheet Metal Flashing and Trim."
2. Install components required for a complete metal wall panel assembly, including trim, copings, corners, lap strips, flashings, sealants, fillers, closure strips, and similar items.
3. Comply with performance requirements and manufacturer's written installation instructions.
4. Set units true to line and level as indicated.

3.05 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a service representative authorized by metal wall panel manufacturer to inspect completed installation. Submit written report.

B. Correct deficiencies noted in manufacturer's report.

3.06 CLEANING AND PROTECTION

A. Remove temporary protective films. Clean finished surfaces as recommended by metal wall panel manufacturer. Clear weep holes and drainage channels of obstructions, dirt, and sealant. Maintain in a clean condition during construction.

B. Replace damaged panels and accessories that cannot be repaired by finish touch-up or minor repair.

END OF SECTION 07 42 13.13

SECTION 07 42 13.23
METAL COMPOSITE MATERIAL WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Exterior cladding consisting of formed metal composite material (MCM) sheet, secondary supports, and anchors to structure, attached to solid backup.
- B. Decorative metal composite material (MCM) facade elements and column covers.
- C. Matching flashing and trim.

1.02 RELATED REQUIREMENTS
- A. Section 07 25 00 - Weather Barriers: Water-resistive barrier behind wall panel system.
- B. Section 07 26 40 - Spray Polyurethane Foam Insulating Air Barrier
- C. Section 07 42 13.13 - Metal Wall and Roof Panels not specified in this Section.
- D. Section 07 62 00 - Sheet Metal Flashing and Trim: Metal flashing components integrated with this wall system.
- E. Section 07 92 00 - Joint Sealants: Sealing joints between siding and adjacent construction and fixtures.

1.03 PRICE AND PAYMENT PROCEDURES
- A. Alternates:
  1. See Section 01 23 00 - Alternates for product alternates affecting this section.

1.04 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) 2022.
- B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- C. 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.
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- F. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2023.
- G. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes 2023.
- H. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip 2023a.
- I. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2023.
- J. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2023.
- K. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process 2023.
- L. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.

M. ASTM D1781 - Standard Test Method for Climbing Drum Peel for Adhesives 1998 (Reapproved 2021).
N. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics 2023.
O. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023c.
P. 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.
Q. 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).
R. 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).
S. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components 2023.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation 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 the installer and relevant sub-contractors.
    2. Include MCM sheet manufacturer’s representative and wall system manufacturer’s representative to review storage and handling procedures.
    3. Review in detail truck transportation, parking, vertical transportation, schedule, personnel, installation of adjacent materials and substrate.
    4. Review procedures for protection of work and other construction.

1.06 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
B. Product Data - MCM Sheets: Manufacturer's data sheets on each product to be used, including thickness, physical characteristics, and finish, and:
    1. Finish manufacturer's data sheet showing physical and performance characteristics.
    2. Storage and handling requirements and recommendations.
    3. Fabrication instructions and recommendations.
    4. Specimen warranty for finish, as specified herein.
C. Product Data - Wall System: Manufacturer's data sheets on each product to be used, including:
    1. Physical characteristics of components shown on shop drawings.
    2. Storage and handling requirements and recommendations.
    3. Installation instructions and recommendations.
    4. Specimen warranty for wall system, as specified herein.
D. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, support clips, exposed fasteners, number of anchors, supports, reinforcement, trim, flashings, and accessories.
    1. Indicate panel numbering system.
    2. Differentiate between shop and field fabrication.
    3. Indicate substrates and adjacent work with which the wall system must be coordinated.
    4. Include large-scale details of anchorages and connecting elements.

5. Include large-scale details or schematic, exploded or isometric diagrams to fully explain flashing at a scale of not less than 1-1/2 inches per 12 inches (1:10).
6. Include design engineer's stamp or seal on shop drawings for attachments and anchors.

E. Selection Samples: For each finish product specified, submit at least two sample color chips representing manufacturer's standard range of available colors and patterns.
1. Sealant Color: Color to match wall panels.

F. Verification Samples: For each finish product specified, submit at least two samples, minimum size 12 inch (305 mm) square, and representing actual product in color and texture.

G. Design Data: Submit structural calculations stamped by design engineer, for Architect's information and project record.

H. Test Report: Submit report of full-size mock-up tests for air infiltration, water penetration, and wind performance.

I. Test Report: Submit test report verifying compliance with NFPA 285 for previously-tested exterior wall assembly.

J. Manufacturer's Field Reports: Provide within 48 hours of field review. State what was observed and what changes, if any, were requested or required.

K. Manufacturer's qualification statement.

L. Installer's qualification statement.

M. Testing agency's qualification statement.

N. Maintenance Data: Care of finishes and warranty requirements.

O. Executed Warranty: Submit warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

P. Warranty Documentation for Installation of Building Rainscreen Assembly: Submit installer warranty and ensure that forms have been completed in Owner's name and registered with installer.

1.07 QUALITY ASSURANCE

A. Field Measurements: Verify actual dimensions by field measurement before fabrication; show recorded measurements on shop drawings.

B. Design Engineer's Qualifications: Design structural supports and anchorages under direct supervision of a Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

C. Manufacturer Qualifications: Company specializing in manufacturing wall panel systems specified in this section.
1. With not less than five years of documented experience.
2. Approved by MCM sheet manufacturer.

D. Installer Qualifications: Company specializing in performing work of type specified in this section.
1. With minimum five years of documented experience.
2. Approved by wall panel system manufacturer.

E. Testing Agency Qualifications: Independent agency experienced in testing assemblies of the type required for this project and having the necessary facilities for full-size mock-up testing of the type specified.

1.08 MOCK-UPS

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Provide a mock-up for evaluation of fabrication workmanship.

C. See Section 04 20 00 - Unit Masonry and Drawings for additional requirements.
D. Approved mock-up will become standard for appearance and workmanship.
   1. Mock-up may not remain as part of the completed work.
   2. Remove mock-up not incorporated into the work and dispose of debris.
   3. Locate where directed.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
   1. Protect finishes by applying heavy-duty removable plastic film during production.
   2. Package for protection against transportation damage.
   3. Provide markings to identify components consistently with drawings.
   4. Exercise care in unloading, storing, and installing panels to prevent bending, warping, twisting, and surface damage.
B. Store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
   1. Store in well-ventilated space out of direct sunlight.
   2. Protect from moisture and condensation with tarpaulins or other suitable weathertight covering installed to provide ventilation.
   3. Store at a slope to ensure positive drainage of accumulated water.
   4. Do not store in enclosed space where ambient temperature can exceed 120 degrees F (49 degrees C).
   5. Avoid contact with other materials that might cause staining, denting, or other surface damage.

1.10 FIELD CONDITIONS

A. Do not install panels when air temperature or relative humidity are outside manufacturer's limits.

1.11 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
B. Special Warranty: Provide 5-year warranty covering water tightness and integrity of seals of wall panels. Complete forms in Owner's name and register with warrantor.
C. Finish Warranty: Provide 20-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.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Composite Material (MCM) Sheet Manufacturers:
   1. ALUCOBOND by 3A Composites USA; ALUCOBOND PLUS: www.alucobondusa.com/#sle.
B. Wall Panel System Manufacturers:
   1. ACM Panelworx Inc; EVO Rivetless Dry Joint Rain Screen: www.acmpanelworx.com/#sle.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 WALL PANEL SYSTEM

A. Wall Panel System: Metal panels, fasteners, and anchors designed to be supported by framing or other substrate provided by others; provide installed panel system capable of maintaining specified performance without defects, damage, or failure.

1. Provide structural design by or under direct supervision of a Structural Engineer licensed in the State in which the Project is located.
2. Provide panel jointing and weatherseal using reveal joints and gaskets but no sealant.
3. Anchor panels to supporting framing without exposed fasteners.

2.03 PERFORMANCE REQUIREMENTS

A. Thermal Movement: Provide for free and noiseless vertical and horizontal thermal movement due to expansion and contraction under material temperature range of minus 20 degrees F (minus 29 degrees C) to 180 degrees F (82 degrees C) without buckling, opening of joints, undue stress on fasteners, or other detrimental effects; allow for ambient temperature at time of fabrication, assembly, and erection procedures.
   1. Wind Performance: Provide system tested in accordance with ASTM E330/E330M without permanent deformation or failures of structural members under the following conditions:
   2. Design Wind Pressure: In accordance with local building code.
      a. Refer to Structural Drawings for additional information.

B. 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.

C. Water Penetration: No water penetration under static pressure when tested in accordance with ASTM E331 at a differential of 10 percent of inward acting design load, 6.27 psf (300 Pa) minimum, after 15 minutes.
   1. Water penetration is defined as the appearance of uncontrolled water on the interior face of the wall.
   2. Design to drain leakage and condensation to the exterior face of the wall.

D. Fire Performance: Use test method complying with NFPA 285.

E. Building Envelope Performance: Comply with ASHRAE Std 90.1 I-P when tested as part of building envelope assembly.

2.04 PANELS

A. Panels: 1 inch (25.4 mm) deep pans formed of metal composite material sheet by routing back edges of sheet, removing corners, and folding edges.
   1. Reinforce corners with riveted aluminum angles.
   2. Provide concealed attachment to supporting structure by adhering attachment members to back of panel; attachment members may also function as stiffeners.
   3. Maintain maximum panel bow of 0.8 percent of panel dimension in width and length; provide stiffeners of sufficient size and strength to maintain panel flatness without showing local stresses or read-through on panel face.
   4. Secure members to back face of panels using structural silicone sealant approved by MCM sheet manufacturer.
   5. Fabricate panels under controlled shop conditions.
   6. Where final dimensions cannot be established by field measurement before commencement of manufacturing, make allowance for field adjustments without requiring field fabrication of panels.
   7. Fabricate as indicated on drawings and as recommended by MCM sheet manufacturer.
      a. Make panel lines, breaks, curves, and angles sharp and true.
      b. Keep plane surfaces free from warp or buckle.
      c. Keep panel surfaces free of scratches or marks caused during fabrication.
   8. Provide joint details providing a watertight and structurally sound wall panel system that allows no uncontrolled water penetration on inside face of panel system.

9. For "dry" jointing, secure extrusions to returned pan edges with stainless steel rivets; provide means of concealed drainage with baffles and weeps for water that might accumulate in members of system.

2.05 MATERIALS

A. Metal Composite Material (MCM) Sheet: Two sheets of aluminum sandwiching a core of extruded thermoplastic material; no foamed insulation material content.
   1. Overall Sheet Thickness: 0.157 inch (4 mm), minimum.
   2. Face Sheet Thickness: 0.020 inch (0.51 mm), minimum.
   3. Bond and Peel Strength: No adhesive failure of the bond between the core and the skin nor cohesive failure of the core itself below 22.4 inch-pound/inch (100 N-mm/mm) with no degradation in bond performance, when tested in accordance with ASTM D1781, simulating resistance to panel delamination, after 8 hours of submersion in boiling water and after 21 days of immersion in water at 70 degrees F (21 degrees C).
   4. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
   5. Flammability: Self-ignition temperature of 650 degrees F (343 degrees C) or greater when tested in accordance with ASTM D1929.

B. Metal 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, configuration as required to meet applied loads and in compliance with applicable building code.
   2. Sheet Steel Components: ASTM A653/A653M galvanized to G90/Z275 or zinc-iron alloy-coated to A60/ZF180; or ASTM A792/A792M aluminum-zinc coated to AZ60/AZM180.

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, with 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 indicated.

B. Color/Texture: As selected by Architect from manufacturer's full range. Basis of Design colors and finishes are as follows:
   1. Color A (Window Brows): Greyhound
   2. Color B (Large Canopies): Market Pearl White Mica
   3. Color C (Column Enclosures): Terracotta - textured.
   4. Refer to Section 01 20 00 for Alternates related to color selections.

2.07 ACCESSORIES

A. Flashing: Sheet aluminum; 0.040 inch (1.0 mm) thick, minimum; finish and color to match MCM sheet; see Section 07 62 00 for additional requirements.

B. 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. Spacing: 24 inches (610 mm) on center, vertically.
   4. Fasteners: As recommended by clip manufacturer.

C. Anchors, Clips, and Accessories: Use one of the following:
   1. Stainless steel complying with ASTM A276/A276M, ASTM A480/A480M, or ASTM A666.
   2. Steel complying with ASTM A36/A36M and hot-dip zinc coating to ASTM A153/A153M.

3. Steel complying with ASTM A36/A36M and hot-dip galvanized to ASTM A123/A123M, with Coating Thickness Grade of 100.

D. Fasteners:
1. Exposed Fasteners: Stainless steel; permitted only where absolutely unavoidable and subject to prior approval of the Architect.
2. 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.
3. Bolts: Stainless steel.
4. Fasteners for Flashing and Trim: Blind fasteners of high-strength aluminum or stainless steel.

E. Bituminous Coating: Cold-applied asphalt mastic, noncorrosive compound free of asbestos, sulfur, and other deleterious impurities; 15-mil (0.38 mm) dry film thickness per coat.

F. Joint Sealer: Provide color to match wall panels silicone sealant of type approved by MCM sheet manufacturer, and in compliance with ASTM C920.
1. See Section 07 92 00 for additional requirements.

G. Provide panel system manufacturer's and installer’s standard corrosion resistant accessories, including fasteners, clips, anchorage devices, and attachments.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine dimensions, tolerances, and interfaces with other work.
1. Verify that weather barrier system is properly installed; see Section 07 25 00 for requirements.

B. Examine substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturer's written instructions.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

D. Notify Architect in writing of conditions detrimental to proper and timely completion of work, and do not proceed with erection until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Protect adjacent work areas and finish surfaces from damage during installation.

B. Provide anchorage items to be cast into concrete or built into masonry to appropriate installer(s) together with setting templates.

3.03 INSTALLATION

A. Do not install products that are defective, including warped, bowed, dented, and broken members, and members with damaged finishes.

B. Comply with instructions and recommendations of MCM sheet manufacturer and wall system manufacturer, as well as with approved shop drawings.

C. Install wall system securely allowing for necessary thermal and structural movement; comply with wall system manufacturer's instructions for installation of concealed fasteners.

D. Do not handle or tool products during erection in manner that damages finish, decreases strength, or results in visual imperfection or failure in performance. Return component parts that require alteration to shop for refabrication, if possible, or for replacement with new parts.

E. Do not form panels in field unless required by wall system manufacturer and approved by the Architect; comply with MCM sheet manufacturer's instructions and recommendations for field

forming.

F. Separate dissimilar metals; use gasket fasteners, isolation shims, or isolation tape where needed to eliminate possibility of electrolytic action between metals.
G. Where joints are designed for field-applied sealant, seal joints completely with specified sealant.
H. Install flashings as indicated on shop drawings. At flashing butt joints, provide a lap strap under flashing and seal lapped surfaces with a full bed of non-hardening sealant.
I. Install square, plumb, straight, and true, accurately fitted, with tight joints and intersections maintaining the following installation tolerances:
    1. Variation From Plane or Location: 1/2 inch in 30 feet (10 mm in 10 m) of length and up to 3/4 inch in 300 feet (20 mm in 100 m), maximum.
    2. Deviation of Vertical Member From True Line: 0.1 inch in 25 feet (3 mm in 9 m) run, maximum.
    3. Deviation of Horizontal Member From True Line: 0.1 inch in 25 feet (3 mm in 9 m) run, maximum.
    4. Offset From True Alignment Between Two Adjacent Members Abutting End To End, In Line: 0.03 inch (0.75 mm), maximum.
J. Replace damaged products.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.
B. Wall System Manufacturer's Field Services: Provide field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with instructions.

3.05 CLEANING

A. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.
B. Remove protective film after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work.
C. Remove temporary coverings and protection of adjacent work areas.
D. Clean installed products in accordance with manufacturer's instructions.

3.06 PROTECTION

A. Protect installed panel system from damage until Date of Substantial Completion.

END OF SECTION 07 42 13.23

SECTION 07 53 00
ELASTOMERIC MEMBRANE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Elastomeric roofing membrane, adhered conventional application.
- B. Insulation, flat and tapered.
- C. Air barrier/vapor retarder.
- D. Cover boards.
- E. Roofing stack boots, roofing expansion joints, and walkway pads.

1.02 RELATED REQUIREMENTS
- A. Section 05 31 00 - Steel Decking: Placement of acoustical insulation for deck flutes.
- B. Section 06 10 00 - Rough Carpentry: Wood blockings.
- C. Section 07 71 00 - Roof Specialties: Manufactured roof specialties, including copings and fascias.

1.03 REFERENCE STANDARDS
- A. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2017.
- B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board 2023a.
- C. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension 2016 (Reapproved 2021).
- D. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers 2000 (Reapproved 2020).
- E. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact 2020.
- F. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022a, with Editorial Revision (2023).
- G. FM (AG) - FM Approval Guide Current Edition.
- H. FM DS 1-28 - Wind Design 2015, with Editorial Revision (2022).
- I. NRCA (RM) - The NRCA Roofing Manual 2023.
- J. NRCA (WM) - The NRCA Waterproofing Manual 2021.
- K. UL (DIR) - Online Certifications 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 affected installers; review preparation and installation procedures and coordination and scheduling necessary for related work.

1.05 SUBMITTALS
- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, and fasteners.
- C. Shop Drawings: Indicate joint or termination detail conditions, conditions of interface with other materials, setting plan for tapered insulation, and mechanical fastener layout.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.
F. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.
G. Installer's qualification statement.
H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.
B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years of documented documented experience.
C. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience, and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.
B. Store materials in weather protected environment, clear of ground and moisture.
C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
D. Protect foam insulation from direct exposure to sunlight.

1.08 FIELD CONDITIONS

A. Do not apply roofing membrane during unsuitable weather.
B. Do not apply roofing membrane when ambient temperature is below 40 degrees F (5 degrees C) or above 90 degrees F (___ degrees C).
C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
E. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.
F. Proceed with work so new roofing materials are not subject to construction traffic as work progresses.
G. Do not allow grease, oil, fats, or other contaminants to come into direct contact with membrane.

1.09 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form signed by Installer, covering Work of this Section, including all components of membrane roofing system such as roofing membrane, base flashing, roof insulation, and walkway products, for the following warranty period:
    1. Warranty Period: Two years from date of Substantial Completion.
C. Manufacturer's Warranty: Manufacturer's Warranty standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Warranty Period: 30 years from date of Substantial Completion.
2. Coverage: Material and labor, no dollar limit, non-pro-rated.
3. Include edge metal in Roofing System Warranty. See Section 07 71 00.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. EPDM Membrane Materials:
   1. Basis of Design: Carlisle SynTec Systems; Sure-Seal EPDM: www.carlisle-syntec.com/#sle.
   2. Elevate; Low Slope Fire Retardant (LSFR) RubberGard EPDM Membrane: www.holcimelevate.com/#sle.
   3. Versico Roofing Systems; VersiGard EPDM: www.versico.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ROOFING

A. Elastomeric Membrane Roofing: One ply membrane, fully adhered, over insulation and cover board.

B. Roofing Assembly Requirements:
   1. Roof Covering External Fire Resistance Classification: UL (DIR) certified Class A.
   2. Factory Mutual Classification: Class 1 and windstorm resistance of 1-90, in accordance with FM DS 1-28.
   3. Insulation Thermal Resistance (R-Value): Provide R-30, minimum, over entire roof deck.
   4. Drainage: No standing water within 48 hours after precipitation.

C. Acceptable Insulation TypesConstant Thickness and Tapered Application:
   1. Minimum 2 layers of polyisocyanurate board.

2.03 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Membrane: Ethylene-propylene-diene-terpolymer (EPDM); non-reinforced; complying with minimum properties of ASTM D4637.
   1. Thickness: 0.090 inch (90 mil) (2.3 mm).
   2. Sheet Width: 120 inches (3,048 mm), minimum; factory fabricate into widest possible sheets.
   3. Color: Black.
   4. Tensile Strength: 1305 psi (9.0 MPa), minimum, measured in accordance with ASTM D412.
   5. Ultimate Elongation: 300 percent, minimum, measured in accordance with ASTM D412.
   6. Tear Strength: 150 lbf per inch (26.3 kN/m), measured in accordance with ASTM D624.
   7. Water Vapor Permeability: 0.10 perm inch (5.74 ng/(Pa s m)), measured in accordance with ASTM E96/E96M.
   8. Brittleness Temperature: -49 degrees F (-45 degrees C), measured in accordance with ASTM D746.

B. Seaming Materials: Standard synthetic-rubber polymer primer and 6-inch wide minimum, butyl splice tape with release film.

C. Membrane Fasteners: As recommended by and approved by membrane manufacturer.

D. Flexible Flashing Material: Same material as membrane.
   1. Tensile Strength: 1,200 psi (8.3 MPa).
   2. Elasticity: 50 percent with full recovery without set.
   3. Color: match membrane color.

2.04 COVER BOARDS

A. Cover Boards: Glass-mat faced gypsum panels complying with ASTM C1177/C1177M.

1. Thickness: 5/8 inch (15.9 mm), Type X, fire-resistant.
2. Products:
   a. Georgia-Pacific; DensDeck Prime Roof Boards with EONIC Technology: www.densdeck.com/#sle.
   b. USG Corporation; Securock Ultralight Coated Glass-Mat Roof Board: www.usg.com/#sle.
   c. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 INSULATION

A. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
   1. Classifications:
      a. Type II: Faced with either cellulosic facers or glass fiber mat facers on both major surfaces of the core foam.
         1) Class 1 - Faced with glass fiber reinforced cellulosic facers on both major surfaces of the core foam.
         2) Compressive Strength: Classes 1-2-3, Grade 3 - 25 psi (172 kPa), minimum.
         3) Thermal Resistance, R-value (RSI-value): At 1-1/2 inches (38 mm) thick; Class 1, Grades 1-2-3 - 8.4 (1.48) at 75 degrees F (24 degrees C).
   2. Board Size: 48 by 48 inches (1220 by 1220 mm).
   3. Board Thickness: 2.0 inch (50 mm) base layer.
   4. Tapered Board: Slope as indicated; minimum thickness 1/2 inch (12.7 mm); fabricate of fewest layers possible. 5.0 inch minumum thickness at drains.
   5. Pre-formed sumps at drains: 4'-0" square; 1/2" per foot slope.
   6. Board Edges: Square.

2.06 ACCESSORIES

A. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.
B. Prefabricated Flashing Accessories:
   1. Corners and Seams: Same material as membrane, in manufacturer's standard thicknesses.
   2. Sealant Pockets: Same material as membrane, with manufacturer's standard accessories, in manufacturer's standard configuration.
C. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches (152 mm) wide; self adhering.
D. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
E. Membrane Adhesive: As recommended by membrane manufacturer.
   1. Provide low-VOC, solvent-based EPDM bonding adhesive that complies with Ozone Transport Commission (OTC) Model Rule, Single Ply Roofing Adhesives; www.otcair.org.
F. Membrane Adhesive Primer: As recommended by membrane manufacturer, and:
   1. Provide low-VOC, solvent-based EPDM bonding adhesive that complies with Ozone Transport Commission (OTC) Model Rule, Single Ply Roofing Adhesives; www.otcair.org.
G. Thinners and Cleaners: As recommended by adhesive manufacturer, compatible with membrane.
H. Insulation Adhesive: As recommended by insulation manufacturer.
I. Sealants: As recommended by membrane manufacturer.
J. Walkway Pads: Suitable for maintenance traffic, visually distinctive from roof membrane.
   1. Composition: Roofing membrane manufacturer's standard.
   2. Size: 30 by 30 inches (762 by 762 mm).
   3. Surface Color: Contrasting with roof membrane color.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and site conditions are ready to receive work.
B. Verify surface is supported and secure.
C. Verify surface is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
D. Verify surface is 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 - METAL DECK

A. Install preformed acoustical glass fiber insulation strips in roof deck flutes in accordance with manufacturer's instructions; see Section 05 31 00.

3.03 INSTALLATION - GENERAL

A. Perform work in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.
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.

3.04 INSTALLATION - INSULATION, UNDER MEMBRANE

A. Attachment of Insulation: Mechanically fasten insulation to deck in accordance with roofing manufacturer's instructions and FM (AG) Factory Mutual requirements.
    1. At areas with exposed structure below, size fasteners for a maximum ¾ inch penetration below deck, and locate in top flute of deck.
    2. At areas with acoustical deck, size fasteners so that they do not penetrate the bottom surface of the deck.
    3. Embed second layer of insulation into full bed of adhesive in accordance with roofing and insulation manufacturers' instructions.
        a. At contractor’s option, second layer of insulation may be mechanically fastened in areas without exposed ceilings.
B. Lay subsequent layers of insulation with joints staggered minimum 6 inches (152 mm) from joints of preceding layer.
C. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
D. On metal deck, place boards _____ to flutes with insulation board edges edges bearing on deck flutes.
E. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
F. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.

G. At roof drains, use factory-tapered boards factory-tapered boards to slope down to roof drains over a distance of 24 inches (610 mm).
   1. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
H. Cover Boards: Embed cover boards into full bed of adhesive in accordance with roofing manufacturer's instructions and FM (AG) Factory Mutual requirements.
   1. Install cover board over insulation with long joints in continuous straight lines with end joints staggered between rows.
   2. For multilayer locations, lay subsequent coverboard layers with joints staggered minimum 6 inch from joints of preceding layer.
I. Do not apply more insulation than can be covered with membrane in same day.

3.05 INSTALLATION - MEMBRANE

A. Install elastomeric membrane roofing system in accordance with manufacturer's recommendations and NRCA (WM) applicable requirements.
B. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
C. Shingle joints on sloped substrate in direction of drainage.
D. Fully Adhered Application: Apply adhesive to substrate at rate recommended by the manufacturer. Fully embed membrane in adhesive except in areas directly over or within 3 inches (75 mm) of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.
E. Overlap edges and ends and seal seams by contact tape or factory applied seam tape, minimum 6 inches (152 mm). Seal permanently waterproof. Apply uniform bead of sealant to joint edge.
F. At intersections with vertical surfaces:
   1. Extend membrane up a minimum of 8 inches (203 mm) onto vertical surfaces.
   2. Fully adhere flexible flashing over membrane and up to termination bar.
   3. Secure flashing under termination bar at 12 inches (304 mm) on center, or as recommended by manufacturer.
   4. Insert flashing into reglets and secure.
G. At roof edges, extend membrane under gravel stop and to the outside face of the wall.
H. Around roof penetrations, seal flanges and flashings with flexible flashing.
I. Install roofing expansion joints where indicated. Make joints watertight.
   1. Install prefabricated joint components in accordance with manufacturer's instructions.
J. Coordinate installation of roof drains and related flashings.
K. Coordinate installation of associated counterflashings installed under other sections.

3.06 ROOF WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.07 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.
B. Provide weekly on-site attendance of roofing and insulation and insulation manufacturer's representative during installation of this work.

3.08 CLEANING

A. See Section 01 70 00 - 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 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 comply with their documented instructions.
E. Repair or replace defaced or damaged finishes caused by work of this section.

3.09 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 07 53 00

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SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Fabricated sheet metal items, including flashings and counterflashings.
- B. Sealants for joints within sheet metal fabrications.

1.02 RELATED REQUIREMENTS
- A. Section 04 20 00 - Unit Masonry: Installation of flashing materials embedded in masonry.
- B. Section 07 25 00 - Weather Barriers: Installation of weather barriers and interface with flashing materials.
- C. Section 07 53 00 - Elastomeric Membrane Roofing: Flashings for membrane roofing
- D. Section 07 71 23 - Manufactured Gutters and Downspouts.

1.03 REFERENCE STANDARDS
- A. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications 2023.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2023.
- C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2023.
- D. ASTM B32 - Standard Specification for Solder Metal 2020.
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- F. ASTM D2178/D2178M - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing 2015a (Reapproved 2021).
- G. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free 2007 (Reapproved 2018).
- 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 01 30 00 - 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 inch (____by____ 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. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Pre-Finished Aluminum: ASTM B209 (ASTM B209M); 20 gage (0.032 inch) (0.81 mm) thick; plain finish shop pre-coated with fluoropolymer coating.
   1. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
   2. Color: As selected by Architect from manufacturer's full colors.

B. Stainless Steel: ASTM A666, Type 304 alloy, soft temper, 28 gauge, 0.0156 inch (0.40 mm) thick; smooth No. 4 - Brushed finish.

2.02 FLASHING TYPES

A. Flashing Type 1: Two-piece interlocking type:
   1. Material: Stainless steel.
   2. Configurations shall be as shown on drawings.
   3. Where cap flashings or counter flashings occur, they shall be of two-piece construction with a receiver having a special vertical locking slot that requires no malleting or bending to hold the insert member in place.
   4. Keyed or corrugated flashings are unacceptable.
   5. Where flashings do not turn up behind walls, terminate with a 1/4" hook dam.
   6. Thru-wall flashings at parapets shall be hemmed flush with the exposed face of face brick.
   7. Fasteners, mastic for sealing and attachment, etc., shall be as recommended by the manufacturer.

B. Flashing Type 2: Masonry thru-wall type:
   1. Stainless steel : ASTM A666 Type 304, soft temper, 0.015 inch (0.4 mm) thick; smooth No. 4 finish.
   2. Configurations shall be as shown on drawings.
   3. Installation: Refer to Section 04 20 00 - Unit Masonry.

C. Flashing Type 2A – Masonry thru-wall type:
   1. Material: Stainless steel core flexible flashing with drainage fabric; with continuous stainless steel drip edge.
   2. Product standard of quality: York Manufacturing, Inc.; York Multi-Flash SS 304.
      a. Substitutions: See Section 01 60 00.
   3. Characteristics:
      a. Type: Stainless steel core with polymer fabric laminated to the bottom stainless steel face with non-asphalt adhesive. The top face (exposed side) must not be covered with a polymer fabric.
      b. Stainless steel: Type 304, ASTM A240
   4. Fabric: polymer fabric; laminated back face (non-exposed side) of stainless steel core.
   5. Accessories:
      a. Mastic/sealant: Product standard of quality is York Manufacturing, Inc.; UniverSeal US100.
      b. Drip edges, outside corner and inside corner material: manufacturer’s standard available units using 26-gauge stainless steel.
      c. End dams: Utilize pre-formed end dams by manufacturer using 26-gauge stainless steel.
      d. Splice material: Product standard of quality is York 304 SS by York. Manufacturer’s standard self-adhered metal material: material matching system material or use Multi-Flash Stainless Steel 6” lap piece and polyether sealant as a splice.

e. Termination bar: Product standard of quality is York T-96 termination bar. Manufacturer's standard 1" composite material bar or a 1" 26-gauge stainless steel termination bar with sealant lip.

6. Configuration shall be as shown on drawings.
7. Installation: Refer to Section 04 20 00 – Unit Masonry

D. Flashing Type 2B: Masonry thru-wall type.
1. Stainless Steel/Polymer Fabric Drainage Plane Flashing - Self-Adhering: ASTM A240/A240M; 2 mil (0.05 mm) type 304 stainless steel sheet with co-polymer butyl adhesive and a removable release liner on one side and a sheet of nonwoven drainage material bonded to the other side.
a. Manufacturers:
1) York Manufacturing, Inc; Flash-Vent SA: www.yorkmfg.com/#sle.
2) Substitutions: See Section 01 60 00 - Product Requirements.
2. Configurations shall be as shown on drawings.
3. Installation: Refer to Section 04 20 00 - Unit Masonry .

E. Flashing Type 3: Membrane roofing base flashing material as specified in Section 07 53 00 - Elastomeric Membrane Roofing .

F. Flashing Type 4: Formed metal flashing (Other than Type 1):
1. Material: Stainless steel.
2. Configurations shall be as shown on drawings.

2.03 ACCESSORIES

A. Fasteners: Stainless steel, with soft neoprene washers.

B. Outside corner and inside corner material; manufacturer's standard available units using:
1. Stainless steel: 26 gauge stainless steel.

C. End dam: Utilize preformed end dams by manufacturer using:
1. Stainless steel: 26 gauge stainless steel

D. Protective Backing Paint: Asphaltic mastic, ASTM D4479 Type I.

E. Sealant to be Concealed in Completed Work: Type 3 as specified in Section 07 92 00.

F. Sealant to be Exposed in Completed Work: Type 1 as specified in Section 07 92 00.

G. Reglets: Surface mounted type, galvanized steel; face and ends covered with plastic tape.

H. Termination Bars: 1 inch wide (25 mm) x 1/8 inch thick (3 mm); stainless steel.

2.04 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 vertical faces with bottom edge formed outward 3/4 inch (19 mm) and hemmed to form drip.

F. Fabricate flashings to allow toe to extend 4 inches (101 mm) over roofing membrane. Return and brake edges.

2.05 GUTTERS AND DOWNSPOUTS

A. See Section 07 71 23 for manufactured gutters and downspouts.

2.06 ACCESSORIES

A. Fasteners: Stainless steel, with soft neoprene washers.

B. Primer Type: Zinc chromate.

C. Concealed Sealants: Non-curing butyl sealant.
D. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
E. Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.
F. Solder: ASTM B32, Alloy Grade - Sn50 (50/50).

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. Conform to drawing details and to the following:
1. SMACNA Architectural Sheet Metal Manual,
B. Insert flashings into reglets to form tight fit; secure in place with plastic wedges; seal flashings into reglets with sealant.
C. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..
D. Apply plastic cement compound between metal flashings and felt flashings.
E. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
F. Fasten cavity wall flashings to stud back-up with a non-corrosive termination bar and seal the top edge of the flashing with sealant.
G. Seal metal joints watertight.

3.04 FIELD QUALITY CONTROL
A. See Section 01 40 00 - Quality Requirements for field inspection requirements.
B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION 07 62 00

SECTION 07 71 00
ROOF SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Manufactured roof specialties, including copings and fascias.

1.02 RELATED REQUIREMENTS
- A. Section 07 53 00 - Elastomeric Membrane Roofing: Roof warranty requirements
- B. Section 07 71 23 - Manufactured Gutters and Downspouts
- C. Section 07 72 00 - Roof Accessories: Manufactured curbs and roof hatches..

1.03 REFERENCE STANDARDS
- A. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems 2022.
- B. NRCA (RM) - The NRCA Roofing Manual 2023.

1.04 SUBMITTALS
- A. See Section 01 30 00 - 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 for Verification: Submit two color chips, 6 by 6 inches (152 by 152 mm), illustrating component shape, finish, and color.
- E. Samples: Submit two appropriately sized samples of coping and fascia.
- F. Manufacturer's Installation Instructions: Indicate special procedures, fasteners, supporting members, and perimeter conditions requiring special attention.

1.05 WARRANTY:
- A. Provide a roofing manufacturer's full system warranty to include roof edge systems.
- B. See Section 07 53 00 for warranty requirements.
- C. Provide a 20-year warranty for painted finishes, covering color fade, chalk and film integrity.

PART 2 PRODUCTS

2.01 MANUFACTURERS
- A. Roof Edge Flashings and Copings:
  1. Hickman Edge Systems: www.hickmanedgesystems.com/#sle.
  2. Metal-Era Inc: www.metalera.com.
  3. Substitutions: See Section 01 60 00 - Product Requirements.
  4. In order to meet warranty requirements of Article 1.06A, Private Label metal roof edge and coping systems by the approved manufacturers, meeting the requirements of this Section, are also acceptable.
- B. Expansion Joint Covers:
  1. Construction Specialties, Inc: www.c-sgroup.com/#sle.
  2. GAF: www.gaf.com/sle.
  3. Johns Manville: www.jm.com.
  4. MM Systems Corp: www.mmsystemscorp.com.
  5. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 COMPONENTS

A. Roof Edge Flashings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
   1. Configuration: Fascia, 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.
   6. Color: To be selected by Architect from manufacturer's full range.
   7. Products:
      a. Hickman Edge Systems; TerminEdge EX Fascia: www.hickmanedgesystems.com/#sle.
      b. Metal-Era, Inc., Anchor-Tite Fascia: www.metalera.com.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

B. Copings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
   1. Configuration: Concealed 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, 0.050 inch (1.3 mm) thick, minimum.
   7. Finish: 70 percent polyvinylidene fluoride.
   8. Color: To be selected by Architect from manufacturer's full range.
   9. Products:
      a. Hickman Edge Systems; Permasnap Cantilever Coping: www.hickmanedgesystems.com/#sle.
      b. Metal-Era, Inc., Perma-Tite Cantilever Coping: www.metalera.com.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

C. Expansion Joint Covers: Composite construction of 6 inch (152 mm) wide flexible compatible flashing of black color with closed cell urethane foam backing, each edge seamed to aluminum sheet metal flanges, designed for nominal joint width of 1 inch (25.4 mm). Include special formed corners, tees, intersections, and wall flashings, each sealed watertight.

D. Pipe and Penetration Flashing: Base of rounded aluminum, compatible with specified roof systems, and capable of accomodating pipes sized between 3/8 inch (9.5 mm) and 12 inch (305 mm).

2.03 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.

2.04 FINISHES

A. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system; color as indicated.

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.

END OF SECTION 07 71 00

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SECTION 07 71 23
MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Pre-finished aluminum gutters and downspouts.
- B. Aluminum downspout shoes.
- C. Precast concrete splash pads.

1.02 RELATED REQUIREMENTS
- A. Section 07 62 00 - Sheet Metal Flashing and Trim.
- B. Section 07 71 00 - Roof Specialties : Roof fascia and copings

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) 2022.
- B. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.

1.04 SUBMITTALS
- A. See Section 01 30 00 - 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: Submit two samples, 12 inch (304 mm) long illustrating component design, finish, color, and configuration.

1.05 DELIVERY, STORAGE, AND HANDLING
- A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.
- B. Prevent contact with materials that could cause discoloration, staining, or damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS
- A. Gutters and Downspouts:
  1. Hickman Edge Systems: www.hickmanedgesystems.com/#sle.
  2. Metal-Era Inc; Seal-Tite Gold Industrial Gutter: www.metalera.com.
  3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS
- A. Pre-Finished Aluminum Sheet: ASTM B209/B209M; 0.050 inch (1.27 mm) thick.
  1. Finish: Plain, shop pre-coated with polyvinylidene fluoride (PVDF) coating.
  2. Color: To match copings and fascia..

2.03 COMPONENTS
- A. Gutters: Profile as indicated.
- B. Downspouts: SMACNA rectangular profile.
- C. Anchors and Supports: Profiled to suit gutters and downspouts.
- D. Fasteners: Stainless steel, with soft neoprene washers.

2.04 FABRICATION

A. Form gutters and downspouts of profiles and size indicated.
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.
D. Hem exposed edges of metal.
E. Fabricate gutter and downspout accessories; seal watertight.

2.05 FINISHES

A. Fluoropolymer Coating: Superior Performance Organic Finish, AAMA 2605, multiple coat, thermally cured fluoropolymer finish system; color as indicated.
B. Primer Coat: Finish concealed side of metal sheets with primer compatible with finish system, as recommended by finish system manufacturer.

2.06 ACCESSORIES

A. Splash Pads: Precast concrete type, profiles size(s) as indicated; minimum 3,000 psi (21 MPa) compressive strength at 28 days, with minimum 5 percent air entrainment.
B. Downspout Shoes: Smooth interior without boxed corners or choke points; include integral lug slots and internal debris grate with cleanout door.
    1. Configuration: Angular.
    2. Height: 30 inches.
    3. Material: Aluminum.
    4. Finish: Manufacturer's standard factory applied powder coat finish.
    5. Accessories: Manufacturer's standard stainless steel building wall anchors.
    6. Locations: Provide at downspout transitions to roof drainage piping. Refer to Drawings for additional information.
    7. Products:
        a. Piedmont Downspout Adapters, SO Series, by Piedmont Pipe Construction, Inc.: www.piedmontpipe.com .
        b. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.
B. Verify that surfaces are ready to receive work.

3.02 PREPARATION

A. Paint concealed sheet metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil, 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. Set splash pads under downspouts.

END OF SECTION 07 71 23

SECTION 07 72 00
ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Roof curbs.
- B. Equipment rails.
- C. Roof hatches, manual and automatic operation, including smoke vents.

1.02 RELATED REQUIREMENTS
- A. Section 07 53 00 - Elastomeric Membrane Roofing
- B. Section 07 71 00 - Roof Specialties: Other manufactured roof specialty items.

1.03 REFERENCE STANDARDS
- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2023.
- B. FM (AG) - FM Approval Guide Current Edition.
- C. UL (DIR) - Online Certifications Directory Current Edition.

1.04 SUBMITTALS
- A. 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.
  5. For smoke hatches, submit evidence of approval by evaluation agency specified.
- B. Shop Drawings: Submit dimensioned, project specific shop drawings for each type of roof-mounted item.
- C. Certificate: For smoke hatches, provide certificate of approval from authority having jurisdiction.
- D. Warranty Documentation:
  1. Submit manufacturer warranty.
  2. Ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING
- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover and elevated above grade.

1.06 WARRANTY
- A. Correct defective Work within a two year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 ROOF CURBS
- A. 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. Applications: Roof curbs used for roof penetrations/openings as indicated on drawings, HVAC units, duct openings, pipe penetrations, and equipment supports.

2. Roof Curb Mounting Substrate: Curb substrate consists of flat roof deck sheathing with insulation.
3. Sheet Metal: Hot-dip zinc coated steel sheet complying with ASTM A653/A653M, SS Grade 33 (230); G90 (Z275) coating designation; 18 gage, 0.048 inch (1.21 mm) thick.
   a. Color: As selected by Architect from manufacturer's standard line of colors.

B. 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: 12 inches (304 mm), minimum.

C. Equipment Rail Curbs: Straight curbs on each side of equipment, with top of curbs horizontal and level with each other for equipment mounting.
1. Height Above Finished Roof Surface: 12 inches (304 mm), minimum.

2.02 ROOF HATCHES AND VENTS, MANUAL AND AUTOMATIC OPERATION

A. Smoke and Heat Vent Manufacturers:
1. Bilco Company: www.bilco.com/#sle.
   a. Type 1: Model ACDSV, 48 x 48.
   b. Type 2: Model ACDSV, 48 x 96.
   c. Type 3: Model ACDSV, 48 x 48.
2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Smoke and Heat Vents:
1. Style: Provide flat metal covers unless otherwise indicated.
2. Mounting Substrate: Provide frames and curbs suitable for mounting on flat roof deck sheathing with insulation.
3. Sound Rated Hatches: minimum OITC of 46.
4. Frames and Curbs: One-piece curb and frame with integral cap flashing to receive roof flashings; extended bottom flange to suit mounting.
   a. Material: Galvanized steel, 10 gage, 0.128 inch (3.2 mm) thick.
   b. Finish: Factory prime paint.
   c. Insulation: Manufacturer's standard; 4 inch (102 mm) rigid mineral wool, located on inside hollow curb.
   d. Curb Height: 12 inches (304 mm) from finished surface of roof, minimum.
5. Metal Covers: Flush, insulated, hollow metal construction.
   a. Capable of supporting 40 psf (1.92 kPa) live load.
   b. Material: Galvanized steel; outer cover 14 gage, 0.0747 inch (1.90 mm) thick, liner 22 gage, 0.03 inch (0.76 mm) thick.
   c. Finish: Factory prime paint.
   d. Insulation: Manufacturer's standard 4 inches (102 mm) rigid mineral wool.
   e. Gasket: EPDM, continuous around cover perimeter.
6. Smoke Vents Types 1 and 2: Provide:
   a. Manual operation only for access, from inside or outside of building.
   b. Disable, or do not provide, fusible links for these units.
7. Smoke Vents Type 3: provide the following additional features and also include manual operation for access:
   a. Smoke Release Mechanism: Automatic opening on melting of replaceable UL (DIR) listed fusible link at 165 deg F (74 deg C).
   b. UL (DIR) or FM (AG) listed as automatically operated smoke and heat vent.
   c. Provide 120V, electrically operated curb-mounted resettable release mechanism. Include three-button push control station ('open', 'close', 'stop') for each smoke vent accessible from the stage floor, at location shown.

1) Bilco Thermolatch II or equivalent product of other listed maufacturers.

d. Fire Alarm Connection: Provide separate resettable electrical link release mechanism and connection point for fire alarm system.

C. Hardware: Steel, zinc coated and chromate sealed, unless otherwise indicated or required by manufacturer.

1. Lifting Mechanisms: Compression or torsion spring operator with shock absorbers that automatically opens upon release of latch; capable of lifting covers despite 10 psf (475 kPa) load.
2. Hinges: Manufacturer's standard piano hinge.
3. Hold open arm with manual release.
4. Latch: Upon closing, engage latch automatically and reset manual release.
5. Manual Release: Pull handle on interior and exterior.
6. Smoke Hatches: Manual release operation not to disturb automatic release mechanisms; easy resetting by Owner's maintenance personnel; provide latch designed to prevent relatching unless automatic release mechanism has been properly reset for automatic operation.

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 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 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 07 72 00

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SECTION 07 81 00 - APPLIED FIREPROOFING

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 sprayed fire-resistive materials (SFRM).

B. Related Requirements:

1. Section 078123 "Intumescent Fireproofing" for mastic and intumescent fire-resistive coatings.
2. Section 099646 "Intumescent Painting" for intumescent paints that are fire retarding but not fire resistive.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at [**Project site**] <**Insert location**>.

1. Review products, design ratings, restrained and unrestrained conditions, densities, thicknesses, bond strengths, and other performance requirements.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Framing plans, schedules, or both, indicating the following:

1. Extent of fireproofing for each construction and fire-resistance rating.
2. Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.
3. Minimum fireproofing thicknesses needed to achieve required fire-resistance rating of each structural component and assembly.
4. Treatment of fireproofing after application.

C. Samples: For each exposed product and for each color and texture specified, in manufacturer's standard dimensions

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and testing agency.

B. Product Certificates: For each type of fireproofing.

C. Evaluation Reports: For fireproofing, from ICC-ES.

D. Preconstruction Test Reports: For fireproofing.

E. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test for compliance with requirements for specified performance and test methods.

1. Bond Strength: Test for cohesive and adhesive strength according to ASTM E 736. Provide bond strength indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
2. Density: Test for density according to ASTM E 605. Provide density indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
3. Verify that manufacturer, through its own laboratory testing or field experience, attests that primers or coatings are compatible with fireproofing.
4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, obtain applied-fireproofing manufacturer's written instructions for corrective measures including the use of specially formulated bonding agents or primers.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not apply fireproofing when ambient or substrate temperature is **44 deg F (7 deg C)** or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.

B. Ventilation: Ventilate building spaces during and after application of fireproofing, providing complete air exchanges according to manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fireproofing dries thoroughly.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Assemblies: Provide fireproofing, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.

B. Fire-Resistance Design: Indicated on Drawings, tested according to **ASTM E 119 or UL 263** by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Steel members are to be considered unrestrained unless specifically noted otherwise.

C. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction.

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Primers, Sealers, and Undercoaters: 200 g/L.
4. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.

D. Low-Emitting Materials: Fireproofing used within the weatherproofing system 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."

E. Asbestos: Provide products containing no detectable asbestos.

2.2 MANUFACTURERS

A. Carboline Company: www.carboline.com.

B. GCP Applied Technologies: www.gcpat.com/fireproofing/#sle.

C. Isolatek International Corp: www.isolatek.com/#sle.

2.3 BASIS OF DESIGN PRODUCTS:

A. GCP Applied Technologies; Monokote Z-106/HY: www.gcpat.com/fireproofing/#sle.

B. Isolatek International Inc; Product Cafco Blaze-Shield HP: www.isolatek.com.

2.4 FIREPROOFING ASSEMBLIES

A. Provide assemblies as indicated on the drawings.

B. Provide UL fire-rated assemblies to hourly ratings as noted on drawings.

2.5 MATERIALS

A. Sprayed Fire-Resistive Material for Interior Applications: Manufacturer's standard factory mixed material, which when combined with water is capable of providing the indicated fire resistance, and conforming to the following requirements:
   1. Composition: Portland cement-based; not mineral fiber-based.
   2. Bond Strength: 1000 pounds per square foot, minimum, when tested in accordance with ASTM E736 when set and dry.
   3. Dry Density: 21 lb/cu ft, minimum, when tested in accordance with ASTM E605.
   4. Effect of Impact on Bonding: No cracking, spalling or delamination, when tested in accordance with ASTM E760.
   5. Corrosivity: No evidence of corrosion, when tested in accordance with ASTM E937.
   6. Air Erosion Resistance: Weight loss of 0.025 g/sq ft, maximum, when tested in accordance with ASTM E859 after 24 hours.
   7. Surface Burning Characteristics: Maximum flame spread index of 0 (zero) and maximum smoke developed index of zero, when tested in accordance with ASTM E84.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and according to each fire-resistance design. Verify compliance with the following:

   1. Substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of fireproofing with substrates under conditions of normal use or fire exposure.
   2. Objects penetrating fireproofing, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
   3. Substrates receiving fireproofing are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fireproofing application.

B. Verify that concrete work on steel deck has been completed before beginning fireproofing work.

C. Verify that roof construction, installation of roof-top HVAC equipment, and other related work is complete before beginning fireproofing work.

D. Conduct tests according to fireproofing manufacturer's written recommendations to verify that substrates are free of substances capable of interfering with bond.

E. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

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

3.2 PREPARATION

A. Cover other work subject to damage from fallout or overspray of fireproofing materials during application.

B. Clean substrates of substances that could impair bond of fireproofing.

C. Prime substrates where included in fire-resistance design and where recommended in writing by fireproofing manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fireproofing.

D. For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of fireproofing. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.

3.3 APPLICATION

A. Construct fireproofing assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, sealers, topcoats, finishing, and other materials and procedures affecting fireproofing work.

B. Comply with fireproofing manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply fireproofing; as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.

C. Coordinate application of fireproofing with other construction to minimize need to cut or remove fireproofing.

1. Do not begin applying fireproofing until clips, hangers, supports, sleeves, and other items penetrating fireproofing are in place.
2. Defer installing ducts, piping, and other items that would interfere with applying fireproofing until application of fireproofing is completed.

D. Metal Decks:

1. Do not apply fireproofing to underside of metal deck substrates until concrete topping, if any, has been completed.
2. Do not apply fireproofing to underside of metal roof deck until roofing has been completed; prohibit roof traffic during application and drying of fireproofing.

E. Install auxiliary materials as required, as detailed, and according to fire-resistance design and fireproofing manufacturer's written recommendations for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by fireproofing manufacturer.

F. Spray apply fireproofing to maximum extent possible. Following the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by fireproofing manufacturer.

G. Extend fireproofing in full thickness over entire area of each substrate to be protected.

H. Install body of fireproofing in a single course unless otherwise recommended in writing by fireproofing manufacturer.

I. For applications over encapsulant materials, including lockdown (post-removal) encapsulants, apply fireproofing that differs in color from that of encapsulant over which it is applied.

J. Where sealers are used, apply products that are tinted to differentiate them from fireproofing over which they are applied.

K. Provide a uniform finish complying with description indicated for each type of fireproofing material and matching finish approved for required mockups.

L. Cure fireproofing according to fireproofing manufacturer's written recommendations.

M. Do not install enclosing or concealing construction until after fireproofing has been applied, inspected, and tested and corrections have been made to deficient applications.

N. Finishes: Where indicated, apply fireproofing to produce the following finishes:

1. Manufacturer's Standard Finishes: Finish according to manufacturer's written instructions for each finish selected.
2. Spray-Textured Finish: Finish left as spray applied with no further treatment.
3. Rolled, Spray-Textured Finish: Even finish produced by rolling spray-applied finish with a damp paint roller to remove drippings and excessive roughness.
4. Skip-Troweled Finish: Even leveled surface produced by troweling spray-applied finish to smooth out the texture and neaten edges.
5. Skip-Troweled Finish with Corner Beads: Even, leveled surface produced by troweling spray-applied finish to smooth out the texture, eliminate surface markings, and square off edges.

3.4 FIELD QUALITY CONTROL

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

1. Test and inspect as required by the IBC, 1704.10.

B. Perform the tests and inspections of completed Work in successive stages. Do not proceed with application of fireproofing for the next area until test results for previously completed applications of fireproofing show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.

C. Fireproofing will be considered defective if it does not pass tests and inspections.

1. Remove and replace fireproofing that does not pass tests and inspections, and retest.
2. Apply additional fireproofing, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.

D. Prepare test and inspection reports.

3.5 CLEANING, PROTECTING, AND REPAIRING

A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.

B. Protect fireproofing, according to advice of manufacturer and Installer, from damage resulting from construction operations or other causes, so fireproofing will be without damage or deterioration at time of Substantial Completion.

C. As installation of other construction proceeds, inspect fireproofing and repair damaged areas and fireproofing removed due to work of other trades.

D. Repair fireproofing damaged by other work before concealing it with other construction.

E. Repair fireproofing by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

END OF SECTION 078100

SECTION 07 84 00
FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Firestopping systems.
- B. Firestopping of joints and penetrations in fire-resistance-rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 RELATED REQUIREMENTS
- A. Section 07 05 53 - Fire and Smoke Assembly Identification.
- B. Section 09 21 16 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

1.03 REFERENCE STANDARDS
- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2022.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems 2023a.
- C. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems 2015 (Reapproved 2019).
- D. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestop Systems 2020a.
- E. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers 2020a.
- F. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus 2023a.
- G. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies 2023.
- H. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015, with Editorial Revision (2021).
- I. ITS (DIR) - Directory of Listed Products Current Edition.
- J. FM (AG) - FM Approval Guide Current Edition.
- K. UL 1479 - Standard for Fire Tests of Penetration Firestops Current Edition, Including All Revisions.
- L. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems Current Edition, Including All Revisions.
- M. UL (DIR) - Online Certifications Directory Current Edition.
- N. UL (FRD) - Fire Resistance Directory Current Edition.

1.04 SUBMITTALS
- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Manufacturer's qualification statement.
- G. Installer's qualification statement.

1.05 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
   1. Listing in UL (FRD) or FM (AG) will be considered as constituting an acceptable test report.
   2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.

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:
   1. Trained by manufacturer.
   2. Verification of minimum three years documented experience installing work of this type.

1.06 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Firestopping Manufacturers:
   1. 3M Fire Protection Products: www.3m.com/firestop.
   2. Hilti, Inc: www.hilti.com/#sle.
   3. Nelson FireStop Products: www.nelsonfirestop.com.
   4. Specified Technologies Inc: www.stifirestop.com/#sle.
   5. International Fireproof Technology, Inc. ; www.painttoprotect.com/.
   6. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS

A. Firestopping Materials: Any materials meeting requirements.

B. Mold and Mildew Resistance: Provide firestopping materials with mold and mildew resistance rating of zero(0) in accordance with ASTM G21.

C. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

D. Fire Ratings: Refer to drawings for required systems and ratings.

2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS

A. General:
   1. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
   2. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

B. Perimeter Fire Containment Firestopping: Use system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of floor assembly.
   1. Where floor assembly is not required to have a fire rating, provide systems that have been tested to show L Rating as indicated.

C. Head-of-Wall (HW) Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of wall assembly.
   1. Movement: Provide systems that have been tested to show movement capability as indicated.
D. Floor-to-Floor (FF), Floor-to-Wall (FW), Head-of-Wall (HW), and Wall-to-Wall (WW) Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
   1. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.
E. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
   1. Temperature Rise: Where penetration is not contained in a wall cavity, provide systems that have been tested to show T Rating equal to F Rating, where required by code.
   2. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

2.04 FIRESTOPPING SYSTEMS

A. Firestopping: Any material meeting requirements.
   1. Fire Ratings: Use system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814, ASTM E119, or UL 1479 with F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
B. Remove incompatible materials that could adversely affect bond.
C. Install backing materials to prevent liquid material from leakage.

3.03 COORDINATION

A. Coordinate construction of openings, penetrations and construction joints to ensure that the fire stop systems are installed according to specified requirements.
B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire stop systems. Coordinate construction and sizing of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
C. Coordinate fire stopping with other trades so that obstructions are not placed in the way prior to the installation of the fire stop systems.
D. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.

3.04 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
B. Do not cover installed firestopping until inspected by authorities having jurisdiction.
C. Install labeling required by code.

3.05 FIELD QUALITY CONTROL

A. Independent Testing Agency: Inspection agency employed and paid by Owner, will examine penetration firestopping in accordance with ASTM E2174 and ASTM E2393.
B. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.06 CLEANING

A. Clean adjacent surfaces of firestopping materials.

3.07 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION 07 84 00

DIVISION 07 SECTION 07 84 13
FIRE PROTECTION, HVAC & PLUMBING PENETRATION FIRESTOPPING
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SECTION 07 4 13
FIRE PROTECTION H AC PLUMBING PENETRATION FIRESTOPPING

PART 1 GENERAL

1.1. 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.

2. Smoke dampers and combination fire/smoke dampers. Refer to Division 23 Section HVAC Air Distribution.

1.2. 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.

1.3. 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.

1.4. 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.

1.5. 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.

1.6. 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.

1.7. 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.

1.8. 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.

1.9. 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

2.1. 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.

2.2. 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.

2.3. 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

3.1. 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.

3.2. 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.

3.3. 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.

3.4. 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.

3.5. 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.

3.6. 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

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SECTION 07 91 00
PREFORMED JOINT SEALS

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Precompressed foam seals.

1.02 RELATED REQUIREMENTS
- A. Section 07 92 00 - Joint Sealants: Liquid and mastic joint sealants and their backing materials.

1.03 REFERENCE STANDARDS
- A. ASTM D1056 - Standard Specification for Flexible Cellular Materials—Sponge or Expanded Rubber 2020.
- B. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness 2015 (Reapproved 2021).
- C. ASTM D2628 - Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements 1991 (Reapproved 2016).
- D. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems Current Edition, Including All Revisions.

1.04 SUBMITTALS
- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's technical data sheets for each product, including chemical composition, movement capability, color availability, limitations on application, and installation instructions.
- C. Color Cards: For color selection.
- D. Samples for Color Selection: 4 inch (102 mm) long pieces of each color available; at least 2 samples of each color.
- E. Volatile Organic Content (VOC) Documentation: For adhesives and primers, submit VOC content and emissions documentation as specified in Section 01 61 16.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.

1.05 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 in this section with at least three years of documented experience.

1.06 WARRANTY
- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within a two year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealers that fail to achieve watertight seal or exhibit loss of adhesion or cohesion.

PART 2 PRODUCTS

2.01 MANUFACTURERS
- A. Precompressed Foam Seals:
  1. EMSEAL Joint Systems, Ltd: www.emseal.com/#sle.

2. Sika Corporation: www.usa-sika.com/#sle.
3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PRECOMPRESSED FOAM SEALS

A. Precompressed Foam Seal: Comprised of urethane, modified-acrylic impregnated, open-cell polyurethane, or closed-cell neoprene foam impregnated with water-repellent, and with self-adhesive faces protected prior to installation by release paper.
1. Color: As selected by Architect.
2. Size as required to provide weathertight seal when installed.
3. Applications:
a. Exterior wall expansion joints.
4. Products:
a. EMSEAL Joint Systems, Ltd; DSM System: www.emseal.com/#sle.
b. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 ACCESSORIES

A. Adhesive: As recommended by seal manufacturer.
B. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and strip seal.
C. Substrate Cleaner: Non-corrosive, non-staining type recommended by seal manufacturer; compatible with joint forming materials.
D. Primer: Type recommended by seal manufacturer to suit application; non-staining.
E. Backing Tape: Self-adhesive polyethylene tape with surface that seal will not adhere to.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive this work.
B. Measure joint dimensions and verify that seal products are of the correct size to properly seal the joints.

3.02 PREPARATION

A. Properly prepare construction components adjacent to the work of this section to prevent damage and disfigurement due to this work.

3.03 INSTALLATION

A. Install in accordance with manufacturer's written instructions.
B. Precompressed Foam Seals:
1. Install only when ambient temperature is within recommended application temperature range of adhesive. Consult manufacturer when installing outside this temperature range.
2. Prepare joints and install seals in accordance with manufacturer's written recommendations.
3. Remove loose materials and foreign matter that could impair adhesion of sealant.
4. Do not stretch precompressed seal; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch (3 to 6 mm) below adjoining surface.

3.04 CLEANING

A. Clean adjacent soiled surfaces.

3.05 PROTECTION

A. Protect joints from damage until adhesives have properly cured.

END OF SECTION 07 91 00

SECTION 07 92 00
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 07 13 00 - Sheet Waterproofing: Sealing cracks and joints in waterproofing substrate surfaces using materials specified in this section.
B. Section 07 25 00 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders.
C. Section 07 84 00 - Firestopping: Firestopping sealants.
D. Section 07 95 13 - Expansion Joint Cover Assemblies: Sealants forming part of expansion joint cover assemblies.
E. Section 08 71 00 - Door Hardware: Setting exterior door thresholds in sealant.
F. Section 08 80 00 - Glazing: Glazing sealants and accessories.
G. Section 09 21 16 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.
H. Section 09 30 00 - Tiling: Sealant between tile and plumbing fixtures and at junctions with other materials and changes in plane.

1.03 SUBMITTALS

A. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes 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. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
    4. Substrates the product should not be used on.
B. 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.
C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
D. 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.
E. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.
F. Field Quality Control Plan: Submit at least two weeks prior to start of installation.
G. 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.

H. 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.

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 the work of this section 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.

D. 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. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
      a. Test date.
      b. Copy of test method documents.
      c. Age of sealant upon date of testing.
      d. Test results, modeled after the sample form in the test method document.
      e. Indicate use of photographic record of test.

E. Field Quality Control Plan:
   1. Visual inspection of entire length of sealant joints.
   2. Non-destructive field adhesion testing of sealant joints, except interior acrylic latex sealants.
   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 meters) in the first 1000 linear feet (305 linear meters), and one test per 1000 linear feet (305 meters) thereafter, or once per floor on each elevation.
      b. If any failures occur in the first 1000 linear feet (305 linear meters), continue testing at frequency of one test per 500 linear feet (152 linear meters) 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.

F. 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. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
   4. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
   5. Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to Owner.
   6. 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.

G. Non-Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Nondestructive Spot Method.
H. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.
   1. Sample: At least 18 inch (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 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 prior to minimum elongation, take necessary measures to correct conditions and re-test; record each modification to products or installation procedures.

1.05 WARRANTY

A. Correct defective work within a five year period after Date of Substantial Completion.
B. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 JOINT SEALANT APPLICATIONS

A. Scope:
   1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
      a. Wall expansion and control joints.
      b. Joints between door, window, and other frames and adjacent construction.
      c. Joints between different exposed materials.
      d. Openings below ledge angles in masonry.
      e. Other joints indicated below.
   2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
      a. Joints between door, window, and other frames and adjacent construction.
      b. Joints between plumbing fixtures and adjacent construction.
   3. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
   4. Do not seal the following types of joints.
      a. Intentional weepholes in masonry.
      b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
      c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
      d. Joints where installation of sealant is specified in another section.
      e. Joints between suspended panel ceilings/grid and walls.
B. Exterior Joints: Use non-sag non-staining silicone sealant, Type 1, unless otherwise indicated.
   1. Type 3 - Lap Joints in Sheet Metal Fabrications: Butyl rubber, non-curing.
C. Interior Joints: Use non-sag acrylic latex sealant, Type 2, unless otherwise indicated.
   1. Interior Expansion and Control Joints: Polyurethane sealant; Type 1A.
   2. Interior Joints at windows, storefront and curtainwall: Polyurethane sealant; Type 1A.
   3. Fire-rated Construction: ASTM C 834, UL Listed.

4. In Sound-Rated Assemblies: Acoustical sealant; Type 5.
5. Type 7 - Narrow Control Joints in Interior Concrete Slabs Exposed to View: Self-leveling polyurea sealant.
6. Interior Wet Areas: Type 6 - Mildew-Resistant Silicone Sealant: not expected to withstand continuous water immersion or traffic. 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.

2.02 JOINT SEALANTS - GENERAL

A. Sealant Types Summary:
1. Type 1: Non-Staining Silicone.
2. Type 1A: Polyurethane.
3. Type 2: Acrylic Emulsion Latex
4. Type 3: Non-Curing Butyl Sealant
5. Type 4: Fire resistant foam sealant: Refer to Section 078400 - Firestopping.
6. Type 5: Acoustical Sealant
7. Type 6: Mildew-Resistant Silicone Sealant
8. Type 7: Self-Leveling Polurea Sealant

2.03 NONSAG JOINT SEALANTS

A. Type 1 - Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus 100 percent, minus 50 percent, minimum.
2. Non-Staining To Porous Stone: Non-staining 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. Color: To be selected by Architect from manufacturer's standard range.
5. Cure Type: Single-component, neutral moisture curing.
6. Service Temperature Range: Minus 65 to 180 degrees F (Minus 54 to 82 degrees C).
7. Manufacturers:
a. Dow Chemical Company; 795 Silicone Building Sealant: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
b. Sika Corporation; Sikasil WS-295: www.usa-sika.com/#sle.
c. Pecora Corporation; 890NST: www.pecora.com.
d. Substitutions: See Section 01 60 00 - Product Requirements.

B. Type 1A - Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single 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 standard range.
4. Service Temperature Range: Minus 40 to 180 degrees F (Minus 40 to 82 degrees C).
5. Manufacturers:
a. Pecora Corporation; DynaTrol 1-XL: www.pecora.com.
b. Sika Corporation; Sikaflex-15 LM: www.usa-sika.com/#sle.
c. Tremco Commercial Sealants & Waterproofing; Dymonic 100: www.tremcosealants.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

C. Type 2 - Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.

D. Type 3 - Non-Curing Butyl Sealant: Solvent-based; ASTM C1311; single component, non-sag, non-skinning, non-hardening, non-bleeding; vapor-impermeable; intended for fully concealed applications.

E. Type 4: Fire resistant foam sealant: Refer to Section 07 84 00 - Firestopping.
F. Type 5 - Acoustical Sealant for Concealed Locations: ASTM C 834, UL Listed.
   1. Composition: Acrylic latex emulsion sealant.
   2. Applications: Use for concealed locations only:
      a. Acoustical application: Sealant bead between top stud runner and structure and between bottom stud track and floor.
   3. Products:
      a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant: www.pecora.com.
      b. Hilti, Inc.; CP 506 Smoke and Acoustical Sealant: www.us.hilti.com.
      c. USG Company; Sheetrock Brand Acoustical Sealant; www.usg.com.
G. Type 6 - Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
   1. Color: White.
   2. Manufacturers:
      a. Pecora Corporation: www.pecora.com.
      b. Sika Corporation; Sikasil GP: www.usa-sika.com.

2.04 SELF-LEVELING SEALANTS

A. Type 7 - Semi-Rigid Self-Leveling Polyurea Joint Filler: Two-component, 100 percent solids; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
   1. Durometer Hardness, Type A: 75, minimum, after seven days when tested in accordance with ASTM D2240.
   2. Color: To be selected by Architect from manufacturer's standard colors.
   3. Joint Width, Minimum: 1/8 inch (3 mm).
   4. Joint Width, Maximum: 3/4 inch (19 mm).
   5. Joint Depth: Provide product suitable for joints from 1/8 inch (3 mm) to 1 inch (25.4 mm) in depth excluding space for backer rod.
   6. Manufacturers:
      a. Adhesives Technology Corporation; Crackbond JF-311: www.atcepoxy.com/#sle.
      b. ARDEX Engineered Cements; ARDEX ARDISEAL RAPID PLUS: www.ardexamericas.com/#sle.
      c. Euclid Chemical Company; EUCO QWIKjoint UVR: www.euclidchemical.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
   1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
   2. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
   3. Manufacturers:
      a. Nomaco, Inc; SOF Rod: www.nomaco.com.
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, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

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 7 days in advance.
    3. Record each test on Preinstallation Adhesion Test Log as indicated.
    4. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.
    5. After completion of tests, remove remaining sample material and prepare joint 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.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
B. Perform installation in accordance with ASTM C1193.
C. Perform acoustical sealant application work in accordance with ASTM C919.
D. 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.
E. Install bond breaker backing tape where backer rod cannot be used.
F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
G. 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.
H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
I. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

3.04 FIELD QUALITY CONTROL

A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.
B. Non-Destructive Adhesion Testing: If there are any failures in first 100 linear feet (30 linear m), notify Architect immediately.
C. Destructive Adhesion Testing: If there are any failures in first 1000 linear feet (300 linear m), notify Architect immediately.
D. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.
E. 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.

END OF SECTION 07 92 00

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SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

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. 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. 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. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
10. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
11. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
12. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
13. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
14. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
15. UL 10C - Positive Pressure Fire Tests of Door Assemblies.

16. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.3 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. Storm Shelter Openings: Provide complete door systems for hurricane or tornado storm shelters, and other areas of refuge, complying and tested according to ICC 500 (2014/2020), ICC/NSSA Standard for the Design and Construction of Storm Shelters.

1. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.

F. 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.

1.4 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.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.6 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.

1.7 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

2.1 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).
3. Steelcraft (S).

2.2 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.

2.3 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, 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 0.37 and R-Value 2.7, 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.

    a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.

2. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-mm) thick steel, Model 2.
3. 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.
4. 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.
5. 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. Curries Company (CU) - Polystyrene Core - 707 Series.
2. Curries Company (CU) - Energy Efficient - 777 Trio-E Series.

2.4 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. Curries Company (CU) – Thermal Break TQ 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. Curries Company (CU) - CM Series.

b. Curries Company (CU) - M 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.

2.5 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.

2.6 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.

2.7 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.

2.8 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. 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 flush face joints continuously; 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 o.c. 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.

2.9 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

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. 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.

3.2 PREPARATION

A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for 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.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 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.

3.4 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.

3.5 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

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors; flush configuration; fire rated and non-rated as scheduled.

1.02 RELATED REQUIREMENTS

A. Section 06 20 00 - Finish Carpentry: Installing wood doors.
B. Section 08 11 13 - Hollow Metal Doors and Frames.
C. Section 08 71 00 - Door Hardware.
D. Section 08 80 00 - Glazing.

1.03 REFERENCE STANDARDS

A. ANSI A135.4 - Basic Hardboard 2012 (R2020).
B. ASTM E413 - Classification for Rating Sound Insulation 2016.
C. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2022.
D. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2022.
E. UL 10B - Standard for Fire Tests of Door Assemblies Current Edition, Including All Revisions.
F. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.
G. UL 1784 - Standard for Air Leakage Tests of Door Assemblies Current Edition, Including All Revisions.
H. WDMA I.S. 1A - Interior Architectural Wood Flush Doors 2013.

1.04 SUBMITTALS

A. See Section 01 30 00 - 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.
D. Samples: Submit two samples of door construction, 12 by 12 inch in size cut from top corner of door.
E. Samples: Submit two samples of door veneer, 12 by 12 inch 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. Specimen warranty.
I. Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products 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 in this section, with not less than three years of documented experience.

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. Inspect for damage.
C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.07 PROJECT CONDITIONS

A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.08 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
C. Include coverage for delamination of veneer, other possible defects, warping beyond specified installation tolerances, other possible defects, defective materials, other possible defects, telegraphing core construction, other possible defects, and other possible defects.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:
   1. Graham Wood Doors: www.grahamdoors.com.
   2. Masonite Architectural;[____]: www.architectural.masonite.com/#sle.
   3. VT Industries, Inc: www.vtindustries.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS

A. Doors: Refer to drawings for locations and additional requirements.
   1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with WDMA I.S. 1A.
   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. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
   3. Smoke and Draft Control Doors: In addition to required fire rating, provide door assemblies tested in accordance with UL 1784 with maximum air leakage of 3.0 cfm per sq ft of door opening at 0.10 inch wg pressure at both ambient and elevated temperatures for "S" label.
   4. Wood veneer facing with factory transparent finish .

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type structural composite lumber core (SCLC), plies and faces as indicated.
B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.04 DOOR FACINGS

A. Veneer Facing for Transparent Finish: Select white maple, veneer grade in accordance with quality standard indicated, quarter cut, with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
   1. Vertical Edges: Any option allowed by quality standard for grade.
   2. Pairs: Pair match each pair; set match pairs within 10 feet (3 m) of each other when doors are closed.
B. Facing Adhesive: Type I - waterproof or Type II - water resistant.

2.05 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.
B. Cores Constructed with stiles and rails:
   1. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.
   2. Provide solid blocking for other throughbolted hardware.
C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
E. Provide edge clearances in accordance with the quality standard specified.

2.06 FACTORY FINISHING - WOOD VENEER DOORS

A. Factory finish to be water based stain and UV curable polyester urethane finish system that complies with all applicable Federal and State regulations for Volatile Organic Compounds (VOC) and Hazardous Air Pollutants (HAP) emission limitations per the EPA Clean Air Act.
B. Finish work in accordance with WDMA I.S. 1A for grade specified and as follows:
   1. Transparent:
      a. System - TR-6, Catalyzed Polyurethane.
      b. Stain: As selected by Architect.
      c. Sheen: Satin.
C. Factory finish doors in accordance with approved sample.
D. Seal door top edge with color sealer to match door facing.

2.07 ACCESSORIES

A. Hollow Metal Door Frames: As specified in Section 08 11 13.
B. Glazing: As specified in Section 08 80 00.
C. Glazing Stops: Wood, of same species as door facing, mitered corners; prepared for countersink style tamper proof screws.
   1. At fire-rated doors, veneer wrap fire-rated flush glazing bead with same species as door facing.
   2. Where vision lite sizes exceed those tested for manufacturer's tested glazing bead, provide veneer-wrapped metal door lite frame by All Metal Stamping, Inc.: www.allmetalstamping.com, that meets opening requirements.
   3. Verify that glazing stops do not interfere with mounting or operation of finish door hardware.
D. Door Hardware: As specified in Section 08 71 00.

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.
    1. Install fire-rated doors in accordance with NFPA 80 requirements.
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. Conform to specified quality standard for fit and clearance tolerances.
B. Conform to specified quality standard for telegraphing, warp, and squareness.
C. Maximum Diagonal Distortion (Warp): 1/8 inch (3 mm) measured with straight edge or taut string, corner to corner, over an imaginary 36 by 84 inches (915 by 2130 mm) surface area.
D. Maximum Vertical Distortion (Bow): 1/8 inch (3 mm) measured with straight edge or taut string, top to bottom, over an imaginary 36 by 84 inches (915 by 2130 mm) surface area.
E. Maximum Width Distortion (Cup): 1/8 inch (3 mm) measured with straight edge or taut string, edge to edge, over an imaginary 36 by 84 inches (915 by 2130 mm) surface area.

3.04 ADJUSTING

A. Adjust doors for smooth and balanced door movement.
B. Adjust closers for full closure.

END OF SECTION

SECTION 08 17 00 – INTEGRATED DOOR OPENING ASSEMBLIES

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. Integrated door opening assemblies including metal frame, integrated door system with operating hardware, and associated door hardware as specified in this section.
2. Factory fitting and hardware preparation for doors and frames.

B. Related Sections:

1. Division 01 Section "General Conditions".
2. Division 08 Section "Hollow Metal Doors and Frames" for integrated assembly doors installed in standard hollow metal frames.
3. Division 08 Section "Glazing" for glass view panels in integrated assemblies.
4. Division 08 Section "Automatic Door Operators" for power assisted door operators installed at integrated assembly openings.
5. Division 09 Section "Interior Painting" for field painting integrated assembly doors and frames.
6. Division 26 "Electrical" Sections for electrical connections including conduit and wiring for door controls and operators installed on integrated assembly doors and frames with factory installed electrical knock out boxes.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
3. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
4. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
5. Intertek Testing Service (ITS Warnock Hersey) - Certification Listings for Fire Doors.
6. ICC/IBC - International Building Code.
7. NFPA 70 - National Electrical Code.
8. NFPA 80 - Fire Doors and Windows.
9. NFPA 101 - Life Safety Code.
10. NFPA 105 - Installation of Smoke Door Assemblies.
11. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
12. CARB – California Air Resources Board.
13. State Building Codes, Local Amendments.

D. Standards: All hardware specified herein to comply with the current version year of the following industry standards:

1. ANSI/BHMA Certified Product Standards, A156 Series.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including integrated opening assembly construction and installation details, material descriptions, core descriptions, hardware reinforcements, profiles, anchorage, fire resistance rating, operational descriptions and finishes.

B. Door Hardware Schedule: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule." Include the following information:

1. Type, style, function, size, label, hand, and finish of each door hardware item.
2. Manufacturer of each item.
3. Fastenings and other pertinent information.
4. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
5. Explanation of abbreviations, symbols, and codes contained in schedule.
6. Mounting locations for door hardware.

C. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of door and frames types including dimensioned profiles and metal thicknesses.
3. Locations of reinforcement and preparations for hardware.
4. Details of anchorages, joints, field splices, and connections.
5. Details of accessories.
6. Details of moldings, removable stops, and glazing.
7. Details of conduit and preparations for power, signal, and control systems.
8. Provide all dimensions necessary required to complete recessed pockets.

D. Keying Schedule: Reference Division 08 Section "Door Hardware" for keying requirements.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete integrated assembly 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 installed assemblies 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 this Section.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to the project site under provisions Division 01 Section "Product Storage and Handling Requirements". Inspect doors, frames, and hardware with representatives of the supplier to verify shipment is complete and to rectify discrepancies promptly.

1. Integrated door assembly systems to be delivered to the job site complete with necessary screws, miscellaneous parts, instructions, and installation templates. Each package legibly and properly labeled to correspond to the approved Door Schedule.

B. Furnish integrated door opening assemblies with operating hardware flush to door skin, using protective wrappings and spacers between projecting hardware. Maintain and protect door assemblies using cardboard spacers and protective edge guards along the door edges, to reduce exposure to marring or damage during storage.

C. Store integrated door opening assemblies in dry and secure area. Do not store electronic access control software, credentials, or accessories at Project site without prior authorization.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.6 COORDINATION

A. 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.

B. Electrical Connections: Coordinate the layout and installation of scheduled electrified 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.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article will not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and are in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Warranty Periods: Manufacturer's standard written form, with the exceptions noted below, warranting integrated door opening assemblies to be free of defect in material or workmanship under normal use for a period of five (5) years.

1. Continuous Hinges: Ten (10) years.
2. Door Closers: Ten (10) years.

C. Warranty includes the manufacturer, at their sole option, agreeing to repair or replace products or parts found to be defective in material or workmanship according to details contained in the warranty certificate.

1.8 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 integrated door opening assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Adams Rite Manufacturing (RD) - The RITE Door.
2. Substitutions: Requests for substitutions and product approval for inclusive integrated door opening assembly systems in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 STEEL MATERIAL REQUIREMENTS

A. General:

1. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

2. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

B. Hollow Metal 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.

1). Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.

3. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-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.

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.

C. Steel Frames:

Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M. Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

1. Fabricate frames with mitered or coped corners.

2. Fabricate frames with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.

3. Frames for openings up to 48 inches in width: Minimum 16 gauge thick steel sheet.

4. Frames for openings 48 inches and wider in width: Minimum 14 gauge thick steel sheet.

5. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

6. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

7. Provide suitable adjustable type anchors for wall condition, minimum 4 each per jamb.

2.3 DOOR HARDWARE MATERIAL REQUIREMENTS:

A. Provide a complete integrated door opening assembly, including the installation and adjustment of the latching mechanism within the door construction.

B. Door hardware to include the following minimum products for each integrated door opening assembly as specified in the Door Hardware Sets under Part 3.

1. Hanging Device: Continuous Hinges (geared or pinned), Pocket Pivots, Offset/Intermediate Pivots, or Butt Hinges.
2. Integrated Locking/Latching Hardware: Exit Devices, Lever Handle Trim, or Flush Push/Pulls.

C. Integrated exit device hardware to be clean and unobtrusive in design with a minimal bar height of 2-7/16-inches. Push rails not exceed a projection of 1-1/8-inches when in the latched position and be made of heavy duty aluminum extrusion, available in anodized and architectural finishes using metal cladding. Exit device end caps to be of metal construction, and should match the trim cover caps when available.

D. Push and pull hardware to be clean and unobtrusive in design with a maximum projection of 1/4-inches on pull side and 5/8-inches on the push side. To be used on hollow metal doors only.

E. Lever handles to be clean and unobtrusive in design with a maximum projection of 3-1/2-inches and match design of similar lever locking hardware furnished on project.

F. Door hardware may include the following optional products for each integrated door opening assembly as specified in the Door Hardware Sets under Part 3:

1. Door Closers: Surface Closer or Pocket Closer.
2. Accessory Items: Magnetic Holders, Protection Plates, Edge Guards, Astragals, Smoke Seals.

2.4 FINISH REQUIREMENTS

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.

B. HPDL Wrapped: Color and pattern as selected by the architect.

C. Embossed Wood Grain Pattern: Color and pattern as selected by the architect from the manufacturer’s standard range.

D. Hardware Finishes: As specified in Hardware Sets.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify the accuracy of dimensions given to the integrated door opening assembly 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. Beginning of installation indicates acceptance of the existing conditions.

D. Verify power supplies, as required, are available to power electrically operated devices.

3.2 INSTALLATION

A. General: Install integrated door opening assemblies plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. 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 by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; integrated locking/latching devices; closing devices; and seals.

C. 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. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
3. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

D. Coordinate installation and interface wiring with fire alarm and smoke detection systems.

E. Remove or protect furnished hardware accessories, prior to painting or finishing completed after the installation of the hardware accessories.

3.3 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.

3.4 ADJUSTMENT

A. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Remove and 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.

3.5 CLEANING AND PROTECTION

A. Protect all door opening assemblies and hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install hardware at the latest possible time frame.

B. Clean operating items as necessary to restore proper finish and provide final protection and maintain conditions that ensure integrated door and operating hardware is without damage or deterioration at time of owner occupancy.

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 or finish paint.

3.6 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain integrated door opening assemblies and hardware.

3.7 HARDWARE SETS

A. The integrated door opening 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.

END OF SECTION

SECTION 08 31 00 - ACCESS DOORS AND PANELS

PART 1 - GENERAL

1.01 SECTION INCLUDES
- A. Wall and ceiling access door and frame units.

1.02 RELATED REQUIREMENTS
- A. Section 09 90 00 - Painting: Field paint finish.

1.03 REFERENCE STANDARDS
- A. UL (FRD) - Fire Resistance Directory Current Edition.

1.04 SUBMITTALS
- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.
- C. Manufacturer's Installation Instructions: Indicate installation requirements.
- D. Project Record Documents: Record actual locations of each access unit.

1.05 QUALITY ASSURANCE
- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.01 ACCESS DOORS AND PANELS ASSEMBLIES
- A. Wall-Mounted Units:
  1. Location: As indicated on drawings.
  2. Material: Steel.
  3. Size: 24 inch by 24 inch, unless otherwise noted.
  4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
  5. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
  6. Tile Mounting Criteria: Provide surface-mounted frame with door surface recessed for infill with wall finish.
  7. Masonry Mounting Criteria: Provide surface-mounted frame with door surface flush with frame surface.
- B. Wall-Mounted Units in Wet Areas:
  1. Location: As indicated on drawings.
  2. Material: Steel, hot-dipped zinc, or zinc-aluminum-alloy coated.
  3. Size: 24 inch by 24 inch, unless otherwise noted.
  4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.
  5. Gypsum Board Mounting Criteria: Provide drywall bead frame with door surface flush with wall surface.
  6. Tile Mounting Criteria: Provide surface-mounted frame with door surface recessed for infill with wall finish.
  7. Masonry Mounting Criteria: Provide surface-mounted frame with door surface flush with frame surface.
- C. Fire-Rated Wall-Mounted Units:
  1. Wall Fire-Rating: As indicated on drawings.

2. Size: 24 by 24 inches, unless otherwise noted.
3. Door/Panel: Insulated double-surface panel, with tool-operated spring or cam lock and no handle.

2.02 WALL AND CEILING MOUNTED UNITS

A. Manufacturers:
1. ACUDOR Products Inc: www.acudor.com/#sle.
2. Babcock-Davis: www.babcockdavis.com/#sle.
3. Bauco Access Panel Solutions Inc: www.accesspanelsolutions.com/#sle.
a. Concealed Hardware and Gypsum Board Inlay: Bauco Plus II - Access Panels.
4. Karp Associates, Inc: www.karpinc.com/#sle.
5. Milcor, Inc: www.milcorinc.com.
6. Nystrom, Inc: www.nystrom.com/#sle.
7. Substitutions: See Section 01 60 00 - 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. Style: Exposed frame with door surface flush with frame surface.
a. Gypsum Board Mounting Criteria: Use drywall bead type frame.
2. Door Style: Single thickness with rolled or turned in edges.
3. Frames: 16 gage, 0.0598 inch, minimum thickness.
4. Single Steel Sheet Door Panels: 1/16 inch, minimum thickness.
5. Units in Fire-Rated Assemblies: Fire rating as required by applicable code for fire-rated assembly that access doors are being installed.
a. Provide products listed by ITS (DIR) or UL (FRD) as suitable for purpose indicated.
b. Provide certificate of compliance from authorities having jurisdiction indicating approval of fire rated doors.
6. Steel Finish: Primed.
7. Primed and Factory Finish: Polyester powder coat; color as selected by Architect from manufacturer's standard colors.
8. Hardware:
a. Hardware for Fire-Rated Units: As required for listing.
b. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.

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

SECTION 08 33 23 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Electric operators and control stations.
B. Overhead coiling doors , operating hardware, non-fire-rated and exterior, electric operation.
C. Wiring from electric circuit disconnect to operators and control stations.

1.02 RELATED REQUIREMENTS

A. Section 08 71 00 - Door Hardware: Cylinder cores and keys.
B. Section 26 05 83 - Wiring Connections: Power to disconnect.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
D. ITS (DIR) - Directory of Listed Products current edition.
E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
F. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts 2000, with Errata (2008).
G. NEMA MG 1 - Motors and Generators 2018.
H. UL (DIR) - Online Certifications Directory Current Edition.
I. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. Product Data: Provide general construction, electrical equipment, and component connections and details.
B. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
C. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, adjustment and alignment procedures.
D. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years documented experience.
C. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for purpose specified.
D. Cycle Life: Standard construction for normal use of up to 20 cycles per day

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Overhead Coiling Doors: Basis of design: Cornell Iron Works, Inc, Product: Thermiser ESD20. Manufacturers offering products that may meet the basis of design specification and design intent include, but are not limited to:
   1. Alpine Overhead Doors, Inc: www.alpinedoors.com/#sle.
   2. C.H.I. Overhead Doors: www.chiohd.com/#sle.
   3. Raynor Garage Doors: www.raynor.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 COILING DOORS

A. Coiling Doors: Steel slat curtain, insulated.
   1. Performance
      a. Capable of withstanding positive and negative wind loads of 20 psf without undue deflection or damage to components.
      b. Air infiltration rate of less than 0.3 CFM/FT2, as tested per ASTM E283 and validated by an independent testing agency.
      c. Insulated door slat Material Requirements:
         1) Flame Spread Index of 0 and a Smoke Developed Index of 10 as tested per ASTM E84.
         2) Minimum Sound Transmission Class (STC) rating of 32 as tested per ASTM E90.
         3) Minimum R-value of 8.0 (U-value of 0.125) as calculated using the ASHRAE Handbook of Fundamental
         4) Insulation to be CFC Free with an Ozone Depletion Potential (ODP) rating of zero.
   2. Materials and Configuration
      a. Slat Material: ASTM A 653/A 653M galvanized steel sheet, Grade 40, Minimum 20 gage.
         1) Galvanizing: Minimum G90 coating.
      b. Curtain Construction: Interlocking slats.
         1) Slat Ends: Alternate slats fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
         2) Nominal Slat Size: 3 inches wide by required length.
         3) Exterior Slat Finish: ASTM A 653 galvanized base coating treated with dual process rinsing agents in preparation of a chemical bonding, baked-on polyester base coat and a baked-on polyester clear powder finish coat. 2.5-3.5 mils cured film thickness. ASTM D-3363 pencil hardness: 2H or better. Tested per ASTM B117.
            (a) Color: As selected by Architect from full range of RAL colors.
         4) Interior slat finish: Coating System and phosphate treatment followed by baked-on polyester powder coat, color as selected by Architect from manufacturer's standard color range, minimum 2.5 mils (0.065 mm) cured film thickness; ASTM D-3363 pencil hardness: H or better.
            (a) Color: As selected by Architect from manufacturers standard colors.
      c. Endlocks: Fabricate interlocking sections with high strength nylon endlocks on alternate slats. Provide windlocks to meet specified wind load.

d. Bottom Bar: Provide reinforced extruded aluminum interior face with full depth insulation and exterior skin slat to match curtain material and gauge. Minimum 4" tall.
e. Weatherstripping (exterior doors): Moisture and rot proof, resilient type.
   1) Bottom Bar, Motor Operated Doors: Sensing/weather edge with neoprene astragal extending full width of door bottom bar.
   2) Guides: Replaceable vinyl strip on guides sealing against fascia side of curtain.
   3) Lintel Seal: Nylon brush seal fitted at door header to impede air flow.
   4) Air Infiltration Certification Label: affix to bottom bar.
f. Guides
   1) Material: ASTM A36/A36M steel angles, primed.
   2) Construction: Continuous, of profile to retain door in place with snap-on trim.
   3) Finish: powder coat, color as selected from manufacturer's standard range.
   4) Provide thermal break at exterior doors.
g. Brackets:
   1) Material: ASTM A36/A36M steel plate, minimum 3/16 inch (5 mm), primed.
   2) Finish: Powder coat, color as selected from manufacturer's standard range.
   3) Permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures.
h. Counterbalance shaft assembly:
   1) Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot of width.
   2) Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 25 lbs. Provide wheel for applying and adjusting spring torque.
i. Hood Enclosure: .
   1) Material: Galvanized steel Minimum thickness; 24 gage, 0.0239 inch.
   2) Configuration: Internally reinforced to maintain rigidity and shape.
   3) Finish: ASTM A 653 galvanized base coating treated with dual process rinsing agents in preparation of a chemical bonding, baked-on polyester base coat and a baked-on polyester finish coat.
   4) Mounting: Surface mounted.
j. Locking:
   1) Cylindrical Locking Mechanism: Master-keyable cylinder. Coordinate with Owner's standard cylinder type.
   2) Location: Operable from coil side of bottom bar.
   3) For motor operated units, provide an integral motor-mounted interlock system to prevent damage to door and operator.

2.03 ELECTRIC OPERATION

A. Electric Operators:
   1. Mounting: Side mounted.
   2. Motor Enclosure:
   3. Motor Rating: 1/2 HP; continuous duty.
   4. Motor Voltage: 120 volts, single phase, 60 Hz.
   5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
   6. Controller Enclosure: NEMA 250, Type 4.
   7. Brake: Manufacturer's standard type, activated by motor controller.
   8. Manual override in case of power failure.
   9. See Section 26 05 83 for electrical connections.

B. Control Station: Provide standard key-operated (Open-Close-Stop) momentary-contact control device for each operator complying with UL 325.
   1. 24 volt circuit.
   2. Recess mounted, at location as shown on Drawings.
   3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
      a. Primary Device: Provide electric sensing edge, wireless sensing, NEMA 1 photo eye sensors, or NEMA 4X photo eye sensors as required with momentary-contact control device.
      b. Secondary Device: Provide electric sensing edge with wireless edge kit or non-monitored safety edge as an option along with continuous-constant control device.

C. Safety Edge: Located at bottom of coiling door, full width, electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object, hollow neoprene covered.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that opening sizes, tolerances and conditions are acceptable.

3.02 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.

D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

E. Coordinate installation of electrical service with Section 26 05 83.

F. Complete wiring from disconnect to unit components.

G. Install enclosure and perimeter trim.

3.03 TOLERANCES

A. Maintain dimensional tolerances and alignment with adjacent work.

B. Maximum Variation From Plumb: 1/16 inch.

C. Maximum Variation From Level: 1/16 inch.

D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 feet straight edge.

3.04 ADJUSTING

A. Adjust operating assemblies for smooth and noiseless operation.

3.05 CLEANING

A. Clean installed components.

B. Remove labels and visible markings.

END OF SECTION

SECTION 08 43 13
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 07 42 13.23 - Metal Composite Material Wall Panels : Custom window surrounds.
B. Section 07 84 00 - Firestopping: Firestop at system junction with structure.
C. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.
D. Section 08 44 13 - Glazed Aluminum Curtain Walls.
E. Section 08 71 00 - Door Hardware: Hardware items other than specified in this section.
F. Section 08 80 00 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site 2015.
B. AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems 2014.
C. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document) 2015.
D. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
E. AAMA 612 - Voluntary Specification, Performance Requirements, and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum 2020, with Errata (2022).
F. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections 2009.
G. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2022.
H. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2022.
I. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2022.
J. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
K. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
L. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.

M. 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.
N. 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).
O. 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).
P. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors 2002 (Reapproved 2018).
Q. 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.

1.05 SUBMITTALS

A. See Section 01 30 00 - 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.
D. Samples: Submit two samples 6 x 6 inches (152 x 152 mm) in size illustrating finished aluminum surface, glass, infill panels, glazing materials.
E. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.
F. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
G. Manufacturer's qualification statement.
H. Installer's qualification statement.

1.06 QUALITY ASSURANCE

A. 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).
        b. Safety Glazing Certification Council (SGCC).
B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.07 MOCK-UPS

A. Provide aluminum-framed storefronts as part of exterior wall assembly mockup. See Section 04 20 00 and Drawings for requirements.
B. See Section 01 40 00 - Quality Requirements for additional requirements.
C. Locate where directed.
D. 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 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
B. Correct defective Work within a five year period after Date of Substantial Completion.
C. Provide 10 year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Aluminum-Framed Storefronts:
   1. Kawneer North America: www.kawneer.com/#sle.
   2. YKK AP America, Inc: www.ykkap.com/commercial/#sle.
   3. Basis of Design: EFCO products; www.efcocorp.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING

A. Center-Set Style, Thermally-Broken:
   1. Basis of Design: EFCO series 403X.
   2. Description: Center set, exterior flush glazed; jambs and vertical mullions continuous; head, sill, intermediate horizontal attached by screw spline joinery.
   3. Components: Manufacturer's standard extruded aluminum mullions, 90 degree corner posts, entrance door framing, and indicated shapes.
   4. Dual Thermal Barrier: Provide dual continuous thermal barriers by means of poured and debridged pockets consisting of a two-part, chemically curing high density polyurethane which is bonded to the aluminum.
   5. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep (51 mm wide by 114 mm deep).
B. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of manufacturers listed above .

2.03 BASIS OF DESIGN -- FRAMING FOR MONOLITHIC GLAZING

A. Center-Set Style:
   1. Basis of Design: EFCO series 402.
   2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep (51 mm wide by 114 mm deep).
B. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of manufacturer listed above .

2.04 BASIS OF DESIGN -- SWINGING DOORS

A. Wide Stile, Monolithic Glazing:
   1. Basis of Design: EFCO series D500.
   2. Thickness: 1-3/4 inches (43 mm).
B. Wide Stile, Insulating Glazing, Thermally-Broken:
   1. Basis of Design: EFCO series D502.
   2. Thickness: 2 inches (51 mm).

C. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of manufacturer listed above .

2.05 ALUMINUM-FRAMED STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Unitized, shop assembly.
   2. Glazing Rabbet: For 1 inch (25 mm) insulating glazing.
   3. Glazing Rabbet: For 1/4 inch (6 mm) monolithic glazing.
   4. Glazing Position: Centered (front to back).
   5. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep (50 mm wide by 114 mm deep).
   6. Finish: Class I natural anodized.
      a. Factory finish all surfaces that will be exposed in completed assemblies.
   7. 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.
   8. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   9. 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.
   10. 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.
   11. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
   12. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
   13. Maintain continuous air barrier and/or vapor retarder seal throughout assembly, primarily in line with inside pane of glazing, and heel bead of glazing compound.

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. See structural drawings for lateral load design factors.
      c. 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 10 psf (480 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 6.27 psf (300 Pa) pressure difference.
   4. Condensation Resistance Factor of Framing: 60, minimum, measured in accordance with AAMA 1503.
   5. Overall U-value Including Glazing: 0.36 Btu/(hr sq ft deg F) (2.04 W/(sq m K)), maximum.

2.06 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
   1. Framing members for interior applications need not be thermally broken.
   2. All aluminum frame extrusions shall have a minimum wall thickness of .080" (2 mm).
   3. Glazing Stops: Flush.
B. Glazing: See Section 08 80 00.
C. Swing Doors: Glazed aluminum.
   1. Thickness:
      a. Insulated Glazing: 2 inches
      b. Monolithic Glazing : 1 3/4 inches
   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.

2.07 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).
B. Fasteners: Stainless steel.
C. Exposed Flashings and Sills: Aluminum sheet, 11 gauge, 0.125 inch (3.18 mm) minimum thickness; finish to match framing members.
D. Concealed Flashings: Sheet aluminum, 20 gauge, 0.032 inch (0.81 mm) minimum thickness.
E. Sill Flashing Sealant: Silicone, compatible with flashing material.
F. Sealant for Setting Thresholds: Non-curing butyl type.
G. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

2.08 FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.

2.09 HARDWARE

A. For each door, include weatherstripping and sill sweep strip.
B. Other Door Hardware: See Section 08 71 00.
C. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
D. Sill Sweep Strips: Resilient seal type, of neoprene; 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. Provide low-expansion foam insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
I. Install hardware using templates provided.
    1. See Section 08 71 00 for hardware installation requirements.
J. Install glass using glazing method required to achieve performance criteria; see Section 08 80 00.
K. 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. See Section 01 40 00 - Quality Requirements for independent field testing and inspection requirements, and requirements for monitoring quality of specified product installations.
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 three tests in each designated area as directed by Architect.
    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 6.20 psf (300 Pa).
        a. Maximum allowable rate of air leakage is 1.5 times specified rate of 0.06 cfm/sq ft (0.3 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.

3.07 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION 08 43 13

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SECTION 08 43 33
FOLDING GLASS STOREFRONT

PART 1 GENERAL

1.01 SUMMARY

A. Section includes floor track supported, sliding-folding, thermally broken, aluminum-framed glass panel system that includes:
   1. Aluminum frame.
   2. Threshold.
   3. Panels.
   4. Sliding-folding and locking hardware.
   5. Weather stripping.
   6. Glass and glazing.
   7. Accessories as required for a complete working installation.

1.02 RELATED SECTIONS

A. Section 07 62 00 - Sheet Metal Flashing and Trim : Flashing gutters, and other sheet metal work.
B. Section 07 92 00 - Joint Sealants: Joint Protection.
C. Section 08 44 13 - Glazed Aluminum Curtain Walls : Openings for folding glass storefront.
D. Section 07 92 00 - Joint Sealants 08 80 00 - Glazing : Glazing materials.

1.03 REFERENCES

A. AAMA. American Architectural Manufacturers Association; www.aamanet.org
   1. AAMA 502, Voluntary Specification for Field Testing of Newly Installed Fenestration Products.
   2. AAMA 520, Voluntary Specification for Rating the Severe Wind-Driven Rain Resistance of Windows, Doors and Unit Skylights.
   3. AAMA 611, Voluntary Specification for Anodized Architectural Aluminum.
   4. AAMA 920, Operation / Cycling Performance.
   5. AAMA 1304, Voluntary Specification for Forced Entry Resistance of Side-Hinged Door Systems.
   6. AAMA/WDMA/CSA 101/I.S.2/A440, NAFS, North American Fenestration Standard - Specification for Windows, Doors and Skylights.
B. ANSI. American National Standards Institute; www.ansi.org
   1. ANSI Z97.1, Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings.
C. ASTM. ASTM International; www.astm.org
   1. ASTM C1036, Standard Specification for Flat Glass.
   2. ASTM C1048, Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.
   3. ASTM E90-09, Standard Test Method for Laboratory Measurements of Airborne Sound Transmission Loss if Building Partitions and Elements.
   4. ASTM E283, Test Method for Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
   5. ASTM E330, Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
   6. ASTM E331, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
   7. ASTM E413, Classification for Rating Sound Insulation.

8. ASTM E547, Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
9. ASTM E1332, Standard Classification for Rating Outdoor-Indoor Sound Attenuation.
10. ASTM E2268, Standard Test Method for Water Penetration of Exterior Windows, Skylights, and Doors by Rapid Pulsed Air Pressure Difference.
11. ASTM F842, Standard Test Methods for Measuring the Forced Entry Resistance of Sliding Door Assemblies.

D. CPSC. Consumer Product Safety Commission; www.cpsc.gov
   1. CPSC 16CFR-1201, Safety Standard for Architectural Glazing Materials

E. NFRC. National Fenestration Rating Council; www.nfrc.org
   1. NFRC 100, Procedure for Determining Fenestration Product U-factors
   2. NFRC 200, Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence
   3. NFRC 400, Procedure for Determining Fenestration Product Air Leakage
   4. NFRC 500, Procedure for Determining Fenestration Product Condensation Resistance Rating Values

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate Folding Glass Storefront system and curtainwall framing rough opening.

B. Pre-installation Meetings: See Section 01 30 00.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: For each Folding Glass Storefront system to be incorporated into the Work. Include performance test results and details of construction relative to materials, dimensions of individual components, profiles, and colors.

C. Shop Drawings: Indicate Folding Glass Storefront system component sizes, dimensions and framing rough opening, configuration, swing panels, direction of swing, stacking layout, typical head jamb, side jambs and sill details, type of glazing material, handle height and field measurements.

D. Installation, Operation and Maintenance Data: Submit Owner’s Manual from manufacturer. Identify with project name, location and completion date, and type and size of unit installed.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer capable of providing complete, precision built, engineered, pre-fitted units with a minimum of ten (10) years experience in the sale of folding-sliding door systems for large openings.

B. Installer Qualifications: Installer experienced in the installation of manufacturer’s products or other similar products for large openings. Installer to provide reference list of at least three (3) projects of similar scale and complexity successfully completed in the last three (3) years.
   1. Installer to be trained and certified by manufacturer.

C. Single Source Responsibility: Furnish Folding Glass Storefront system materials from one manufacturer for entire Project.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer’s instructions and recommendations, Section 01 60 00 requirements, and as follows:
   1. Deliver materials to job site in sealed, unopened cartons or crates.
      a. Upon receipt, inspect the shipment to ensure it is complete, in good condition and meets project requirements.

2. Store material under cover in a clean and dry location, protecting units against weather and defacement or damage from construction activities, especially to the edges of panels.

1.08 FIELD CONDITIONS

A. Field Measurements: Contractor to field verify dimensions of rough openings and threshold depressions to receive sill. Mark field measurements on product drawing submittal.

1.09 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide Folding Glass Storefront system manufacturer's standard limited warranty as per manufacturer's published warranty document in force at time of purchase, subject to change, against defects in materials and workmanship.

1. Warranty Period beginning at Date of Substantial Completion:
   a. Rollers and Glass Seal Failure: Ten (10) years
   b. All Other Components: Ten (10) years

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis-of-Design Product by Manufacturer: NanaWall SL70 by NANA WALL SYSTEMS, INC. (www.nanawall.com)

NANA WALL SYSTEMS, INC.
100 Meadow Creek Drive, Corte Madera, CA 94925
Toll Free: (800) 873-5673
Email: info@nanawall.com

1. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PERFORMANCE / DESIGN CRITERIA

A. Low Profile Saddle Sill - Inward Opening

1. Air Infiltration (ASTM E283):
   a. 0.15 cfm/ft^2 (0.76 L/s/m^2) at a static air pressure difference of 1.57 psf (75 Pa)
   b. 0.29 cfm/ft^2 (1.47 L/s/m^2) at a static air pressure difference of 6.24 psf (300 Pa)
2. Water Penetration (ASTM E331, ASTM E547):
   a. No uncontrolled water leakage at a static (with weeps) test pressure of 5.25 psf (250 Pa)
3. Structural Loading (ASTM E330):
   a. Windload Resistance: Pass; C4
      1) Design Pressure Positive: 70 psf (3350 Pa)
      2) Design Pressure Negative: 70 psf (3350 Pa)

B. Items below are common to all sill types, except as noted.

1. Swing Panel - Operation / Cycling Performance (AAMA 920): 500,000 cycles
2. System - Life Cycle Performance (DIN EN 1191/12400): 20,000 cycles
3. Folding Glass Storefront Units tested to AAMA/WDMA/CSA 101/I.S.2/A440.
4. Thermal Performance (U-factor): NFRC 100 rated, certified, and labeled
5. Solar Heat Gain Coefficient (SHGC) + Visible Light Transmission (VT): NFRC 200 rated, certified, and labeled
6. Air Leakage: NFRC 400 rated, certified, and labeled
7. Condensation Resistance Factor (CRF): NFRC 500 rated, certified, and labeled
8. EPA Energy Star: Meets requirements with specific glass

C. Design Criteria:

1. Sizes and Configurations: As indicated by the Drawings for selected number and size of panels, location of swing panels, and location of track and stacking.

2. Unit Operation: Sliding and folding hardware with top and bottom tracks.
3. Panel Configuration:
   a. Straight
4. Stack Storage Configuration:
   a. Inswing
5. Floor track supported
6. Panel Pairing Configuration: See drawings.

2.03 MATERIALS

A. Monumental Thermally Broken Aluminum Framed Folding Glass Storefront Description: Floor track supported system designed for angle changes, segmented curves. Manufacturer's standard or post reinforced frame and panel profiles, with top track, side jambs and panels with dimensions as shown on Drawings.
   1. Panels and Frames
      a. Panels
         1) Single lite.
         2) Panel Size (W x H): As shown on drawings.
         3) Rail Depth: 2-3/4 inch (70 mm)
         4) Top Rail and Stile Width: 2-1/4 inch (57 mm)
         5) Bottom Rail Height: 10 inch (254 mm)
      b. Frame:
         1) Matching top track and side jambs
            (a) Top Track and Side Jambs Width: 2-9/16 inch (65 mm)
            (b) Top Track and Side Jambs Depth: 3-1/8 inch (80 mm)
         2) Sill Type:
            (a) Low profile saddle sill (thermally broken)
         3) Sill Finish: Aluminum, clear anodized.
         4) ADA Compliance: Provide gasket to cover the channel in the sill at swing doors.
   2. Aluminum Extrusion: AlMgSi0.5 alloy, 6063-T5 (F-22 - European standard)
      a. Thickness: 0.078 inch (2.0 mm) nominal
      b. Thermal Break: 3/4 to 15/16 inch (20 to 24 mm) wide polyamide plastic reinforced with glass fibers. Thinner or poured and de-bridged type thermal breaks not acceptable.
   3. Panel and Frame Aluminum Finish: Inside and Outside;
      a. Same (one-color)
      b. Anodized (AAMA 611): Clear.
      c. PVDF Coat (AAMA 2605): Fluoropolymer Kynar with color to match custom finish.

B. Glass and Glazing:
   1. Safety Glazing: In compliance with ASTM C1036, ASTM C1048, ANSI Z97.1 and CPSC 16CFR 1201.
   2. Glazing: Tempered glass lites in double insulated glazing units, dry glazed with glass stops on the inside.
      a. See Section 08 80 00 - Glazing, Glass Type 1A.

C. Locking Hardware and Handles:
   1. Main Entry Pair of Panels on Models WITHOUT a Swing Panel: Provide manufacturer's standard L-shaped handles on the inside and outside, including a lock set with profile cylinder. Operation of lockset is by turn of key from outside and thumb-turn inside with two-point locking hardware operated by 180º turn of the handle.
      a. L-Shaped Handles - Finish:
         1) Brushed satin stainless-steel

2. Secondary Panels and Pairs of Folding Panels: Provide manufacturer's Standard secondary handles and concealed two-point locking hardware operated by 180º turn of handle between each pair. Face applied flush bolt locking NOT acceptable.
    a. Standard Secondary Handle - Finish:
        1) Brushed satin stainless-steel
3. Handle Height: 41-3/8 inch (105 cm) centered from bottom of panel or as otherwise indicated.
4. Aluminum locking rods with standard fiberglass reinforced polyamide end caps at the top and bottom. Rods to have a stroke of 15/16 inch (24 mm).

D. Sliding-Folding Hardware: Provide manufacturer's standard combination sliding and folding hardware with top and bottom tracks and threshold. All running carriages to be with sealed, self-lubrication, ball bearing multi-rollers. Surface mounted hinges and running carriages NOT acceptable. Weight of panels borne by the bottom of the guide channel in the sill is NOT acceptable.
    1. Lower Running Carriage Carrying Capacity: 440 lbs. (200 kgs)
    2. Upper guide carriage and lower running carriage provided with four vertical stainless-steel wheels and two horizontal polyamide wheels.
    3. Vertical wheels to ride on top of stainless-steel guide track covers over the full length of the sill track and lie above the water run-off level.
    4. Wheels riding below water run-off level and wheels riding on aluminum surfaces are NOT acceptable.
    5. Swing Panel Hinges:
        a. Stainless-steel hinges and security hinge pins with set-screws.
    6. Adjustment: Provide folding-sliding hardware capable of compensation and adjustments without needing to remove panels from tracks, in width, 1/16 inch (1.5 mm) per hinge and in height, 5/64 inch (2 mm) up and down.
E. Weather stripping: Manufacturer's double layer EPDM between panels, EPDM gasket and Q-lon gasket, or brush seal between panel and frame, or brush seals with a two-layer fiberglass reinforced polyamide fin attached at both inner and outer edge of bottom of door panels with a recessed sill or on frame for sealing between panels and between panel and frame.
F. Fasteners: Tapered pins or stainless-steel screws for connecting frame components.

2.04 FABRICATION

A. Folding Glass Wall: Extruded aluminum frame and panel profiles, corner connectors and hinges, sliding and folding hardware, locking hardware and handles, glass and glazing and weather stripping.
    1. Each unit factory pre-assembled and shipped with complete system components and installation instructions.
    2. Exposed work to be carefully matched to produce continuity of line and design with all joints.
    3. No raw edges visible at joints.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine rough openings with Installer present, for compliance with requirements affecting Work performance.
    1. Examine surfaces of openings and verify dimensions; verify rough openings are level, plumb, and square with no unevenness, bowing, or bumps on the floor; and other conditions as required by the manufacturer for readiness to receive Work.

2. Verify structural integrity of the header for deflection with live and dead loads limited to the lesser of L/720 of the span or 1/4 inch (6 mm). Provide structural support for lateral loads, and both wind load and eccentric load when the panels are stacked open.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. General: Install Folding Glass Storefront system in accordance with the Drawings, approved submittals, manufacturer's recommendations, and installation instructions, and as follows:
   1. Properly flash, waterproof and seal around opening perimeter.
   2. Securely attach anchorage devices to rigidly fit frame in place, level, straight, plumb and square. Install frame in proper elevation, plane and location, and in proper alignment with other work.
   3. When lower track is designed to drain, provide connections to allow for drainage.
   4. Install panels, handles, lockset, and other accessories in accordance with manufacturer's recommendations and instructions.

3.03 FIELD QUALITY CONTROL

A. Verify the Folding Glass Storefront system operates and functions properly. Adjust hardware for proper operation.
B. Non-Conforming Work: Repair or replace non-conforming work as directed by the Architect; see General and Supplementary Conditions, and Division 01, General Requirements.

3.04 CLEANING AND PROTECTION

A. Keep units closed and protect Folding Glass Storefront installation against damage from construction activities.
B. Remove protective coatings and use manufacturer recommended methods to clean exposed surfaces.

END OF SECTION 08 43 33

SECTION 08 44 13
GLAZED ALUMINUM CURTAIN WALLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed curtain wall, with vision glazing and infill panels.
B. Firestopping between curtain wall and edge of floor slab.

1.02 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping: Firestop at system junction with structure.
B. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.
C. Section 08 43 13 - Aluminum-Framed Storefronts: Aluminum Storefronts, Entrance framing and doors.
D. Section 08 43 33 - Folding Glass Storefront : Attachment of folding storefront assemblies.
E. Section 08 80 00 - Glazing.
F. Section 09 21 16 - Gypsum Board Assemblies: Metal stud and gypsum board wall at interior of curtain wall.

1.03 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site 2015.
B. AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems 2014.
C. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
D. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections 2009.
E. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
F. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
G. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
H. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.
I. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
J. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
K. ASTM C1249 - Standard Guide for Secondary Seal for Sealed Insulating Glass Units for Structural Sealant Glazing Applications 2018 (Reapproved 2023).
L. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer 2015 (Reapproved 2022).
M. ASTM C793 - Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants 2023.
N. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants 2018 (Reapproved 2022).
O. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.

P. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems 2023.
Q. ASTM C1135 - Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants 2019.
R. ASTM C1184 - Standard Specification for Structural Silicone Sealants 2023.
S. ASTM C1249 - Standard Guide for Secondary Seal for Sealed Insulating Glass Units for Structural Sealant Glazing Applications 2018 (Reapproved 2023).
T. ASTM C1401 - Standard Guide for Structural Sealant Glazing 2023.
U. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).
V. 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.
W. 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).
X. ASTM E413 - Classification for Rating Sound Insulation 2022.
Y. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors 2002 (Reapproved 2018).
Z. 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).
AA. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic) 2019.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, internal drainage details, glazing, and infill.
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.
D. Shop Drawings: Provide details of proposed structural sealant glazing (SSG) and weather sealant joints indicating dimensions, materials, bite, thicknesses, profile, and support framing.
E. Samples: Submit two samples 12 by 12 inches (304 by 304 mm) in size illustrating finished aluminum surface, glazing, and glazing materials.
F. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
G. Structural Sealant Glazing (SSG): Submit product data and calculations showing compliance with performance requirements.
H. Test Reports: Submit results of full-size mock-up testing. Reports of tests previously performed on the same design are acceptable.
I. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
J. Manufacturer's Qualification Statement.
K. Installer's Qualification Statement.

L. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Designer Qualifications: Design curtain wall and its structural support framing components 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. Verify that each component is appropriate for use in structural sealant glazing (SSG) application in regards to at least the following properties: size, shape, dimensions, material, durability, storage conditions, and color.
C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than 10 years of documented experience.
D. Installer Qualifications: Company specializing in performing work of type specified and with at least 5 years of documented experience.

1.07 MOCK-UPS

A. See Section 01 40 00 - Quality Requirements for additional requirements.
B. Provide glazed aluminum curtainwall as part of exterior wall assembly mockup. See Section 04 20 00 and Drawings for requirements.
C. Locate where directed.
D. 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 01 78 00 - Closeout Submittals for additional warranty requirements.
B. Manufacturer Warranty: Provide 10 year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units. Complete forms in Owner's name and register with installer.
C. 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.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Glazed Aluminum Curtain Walls Manufacturers:
   1. Kawneer North America: www.kawneer.com/#sle.
   2. YKK AP America, Inc: www.ykkap.com/commercial/#sle.
   3. Basis of Design: EFCO products; www.efcocorp.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 BASIS OF DESIGN - CURTAIN WALL SYSTEMS

A. Ballistic Tested:

1. Basis of Design: EFCO series 5600.

B. Pressure Cap at Horizontals with Two (2)-Sided Structural Sealant Glazing (SSG) at Verticals; Unitized:
   1. Basis of Design: EFCO series 5600.
C. Pressure Cap Four Sides; Not Unitized, Field Assembled:
   1. Basis of Design: EFCO series 5600.
D. Other Manufacturers: Provide either product identified as "Basis of Design" or an equivalent product of approved manufacturer listed above.

2.03 CURTAIN WALL

A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Outside glazed, with pressure plate and mullion cover, where indicated on drawings.
   2. Structural sealant glazing (SSG) adhesive on two (2)-sides, with temporary glazing stops, and pressure plate and mullion cover on 2-sides, where indicated on drawings.
   3. Fabrication Method: Field fabricated stick system.
   4. Glazing Method: Field glazed system.
   5. Vertical Mullion Face Width: 2-1/4 inches (57 mm).
   6. Vertical Mullion Depth From Face of Glazing to Back of Frame: 6-1/2 inches (165 mm).
   7. Finish: Class I natural anodized.
      a. Factory finish surfaces that will be exposed in completed assemblies.
      b. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
   8. Provide flush joints and corners, weathersealed, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   9. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   10. 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.
   11. Maintain continuous air barrier and/or vapor retarder seal throughout assembly, primarily in line with inside pane of glazing and heel bead of glazing compound.
   12. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
B. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
   1. Design Wind Loads: Comply with the requirements of ASCE 7
   2. See structural drawings for lateral load design factors.
   3. Movement: Accommodate the following movement without damage to components or deterioration of seals:
      a. Expansion and contraction caused by 180 degrees F (82 degrees C) surface temperature.
      b. Expansion and contraction caused by cycling temperature range of 170 degrees F (77 degrees C) over a 12 hour period.
      c. Movement of curtain wall relative to perimeter framing.
      d. Deflection of structural support framing, under permanent and dynamic loads.
   4. Structural Sealant Glazing (SSG) System: For individual glass lites, design framing members to not exceed a deflection normal to the wall of L/175 between supports with 3/4 inch (19 mm) maximum, and a deflection parallel to the wall of L/360 with 1/8 inch (3.2 mm) maximum, whichever is less.

C. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on indoor face when tested as follows:
   1. Test Pressure Differential: 15 psf (720 Pa).
   2. Test Method: ASTM E331.
D. Air Leakage: 0.06 cfm/sq ft (0.3 L/sec sq m) maximum leakage of wall area when tested in accordance with ASTM E283/E283M at 6.24 psf (300 Pa) pressure difference across assembly.
E. Thermal Performance Requirements:
   1. Condensation Resistance Factor of Framing: 70, minimum, measured in accordance with AAMA 1503.
   2. Overall U-value Including Glazing: 0.42 Btu/(hr sq ft deg F) (2.38 W/(sq m K)), maximum.
F. Ballistic Performance Requirements (See Drawings for locations):
   1. System shall be designed to defeat ballistic assaults from ballistic projectiles in accordance with UL 752 Level 2.
      a. Glazing: Glazing to conform to UL 752, Level 2. See Section 08 80 00.
   2. Bullet Resistant Pressure Plate Framing System. Head and sill are multi piece extrusions with an integral weep system at the sill. Jambs are multi-piece extrusions with removable faces to allow for reglazing. Mullions are multi piece extrusions with removable faces to allow for glazing and lite replacement. All joints and connections shall be tight, providing hairline joints and true alignment of adjacent members.

2.04 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
   1. Vertical and horizontal extrusions shall have a minimum wall thickness of .093" (2.3 mm) to .125" (3 mm).
   2. Cross-Section: As indicated on drawings.
   3. Provide profiled face covers as indicated.
B. Glazing: See Section 08 80 00.
C. Custom Canopies: Shop fabricated, shop finished, extruded aluminum outriggers, decking, gutters, and fascia, free of defects impairing strength, durability or appearance.
   1. Configuration: As indicated on drawings.
   2. Outrigger Shape: Tapered.
   3. Design Criteria: Design and fabricate to resist the same loads as curtain wall system as well as the following loads without failure, damage, or permanent deflection:
      a. Snow: 25 psf (1.2 kPa); minimum.
      b. Live: 5 psf (0.24 kPa); minimum.
      c. Thermal Movement: Plus/minus 1/8 inch (3.175 mm), maximum.
   4. Sizes: As indicated on drawings.
   5. Finish: Same as curtain wall mullion sections.

2.05 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).
B. Sheet Aluminum: ASTM B209/B209M.
C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
D. Structural Supporting Anchors Attached to Structural Steel: Design for welded attachment.
E. Fasteners: Stainless steel; type as required or recommended by curtain wall manufacturer.

F. Exposed Flashings and Sills: Aluminum sheet, 11-gauge, 0.125-inch (3.18 mm) minimum thickness; finish to match framing members.
G. Concealed Flashings: Sheet aluminum, 20-gauge, 0.032-inch (0.81 mm) minimum thickness.
H. Firestopping: See Section 07 84 00.
I. Structural Sealant Glazing (SSG) Adhesive: Neutral curing, silicone sealant formulated for SSG applications in compliance with ASTM C1184 and structural glazing industry guidelines, ASTM C1401.
    1. SSG adhesive in compliance with ASTM C920; Type S - Single-component, Grade NS, Class 50, Use NT, G, and A.
    2. Ultimate Tensile Strength: Minimum of 50 psi (345 kPa) as determined by test method ASTM C1135 under the following conditions.
        a. Exposure to air temperatures of 190 degrees F (88 degrees C) and minus 20 degrees F (minus 29 degrees C).
        b. Water immersion for seven (7) days, minimum.
        c. Exposure to weathering for 5,000 hours, minimum.
    3. Sealant Design Tensile Strength: 20 psi (139 kPa), maximum.
    4. Hardness: 20 to 60 with Type A-2 durometer in compliance with test method ASTM C661.
    5. SSG sealant tested for compatibility with glazing accessories in compliance with ASTM C1087, tested for accelerated weathering in compliance with ASTM C793, and in compliance with insulating glass secondary sealant design standards of ASTM C1249.
J. Weatherseal Sealant: Silicone, with adhesion in compliance with ASTM C794; compatible with glazing accessories.
K. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
L. Glazing Accessories: See Section 08 80 00.
M. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.06 FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other related work.
B. Verify that curtain wall openings and adjoining water-resistive and air barrier seal materials are ready to receive work of this section.
C. Verify that anchorage devices have been properly installed and located.

3.02 INSTALLATION

A. Install curtain 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. Install firestopping at each floor slab edge.

H. Provide low-expansion foam insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
I. Pressure Plate Framing: Install glazing and infill panels using exterior dry glazing method; see Section 08 80 00.
J. Structural Sealant Glazing (SSG) Adhesive: Install structural sealant glazing adhesive and weatherseal sealant in accordance with manufacturer's instructions.
K. 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/m) noncumulative or 0.5 inches per 100 feet (12 mm/30 m), whichever is less.
B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch (0.8 mm).
C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch (19 mm) and minimum of 1/4 inch (6 mm).

3.04 FIELD QUALITY CONTROL

A. Provide services of curtain wall manufacturer's field representative to observe for proper installation of system and submit report.
B. Provide field testing of installed curtain wall 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 directed by Architect.
    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 8.00 psf (383 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 6.20 psf (300 Pa).
        a. Maximum allowable rate of air leakage is 0.09 cfm/sq ft (0.5 L/s sq m).
C. Repair or replace curtain wall components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.05 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, take care to remove dirt from corners, and wipe surfaces clean.

3.06 PROTECTION

A. Protect installed products from damage until mm-dd-yyyy.

END OF SECTION 08 44 13

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SECTION 08 45 23
TRANSLUCENT WALL ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fiberglass reinforced plastic (FRP) sandwich panel system and accessories.
   1. Wall panel system.
      a. Windows within wall panel system.
      b. Louvers within wall panel system.

1.02 RELATED REQUIREMENTS

A. Section 07 25 00 - Weather Barriers: Sealing perimeter frame to weather barrier installed on adjacent construction.
B. Section 07 92 00 - Joint Sealants: Sealing joints between perimeter frame and adjacent construction.
C. Section 08 80 00 - Glazing.

1.03 REFERENCE STANDARDS

A. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/Specification for Windows, Doors, and Skylights 2022.
B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
C. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections 2009.
D. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
E. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
F. ASTM C297/C297M - Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions 2016.
G. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position 2022.
H. ASTM D1002 - Standard Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal) 2010 (Reapproved 2019).
I. ASTM D1037 - Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials 2012 (Reapproved 2020).
J. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates 2023.
K. ASTM E72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction 2022.
L. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023c.
M. 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.

N. 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).
O. 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).
P. ASTM E972 - Standard Test Method for Solar Photometric Transmittance of Sheet Materials Using Sunlight 1996 (Reapproved 2021).
Q. ASTM E1886 - Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials 2019.
R. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes 2023.
S. ASTM E2707 - Standard Test Method for Determining Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure 2015.
T. FBC TAS 201 - Impact Test Procedures; Testing Application Standard 1994.
U. FBC TAS 202 - Criteria for Testing Impact and Non-Impact Resistant Building Envelope Components Using Uniform Static Air Pressure; Testing Application Standard 1994.
V. FBC TAS 203 - Criteria for Testing Products Subject To Cyclic Wind Pressure Loading; Testing Application Standard 1994.
W. ICC-ES AC05 - Acceptance Criteria for Sandwich Panel Adhesives 2009, with Editorial Revision (2020).
X. ICC-ES AC177 - Acceptance Criteria for Translucent Fiberglass Reinforced Plastic (FRP) Faced Panel Wall, Roof and Skylight Systems 2014, with Editorial Revision (2018).
Y. ISO/IEC 17065 - Conformity Assessment - Requirements for Bodies Certifying Products, Processes and Services 2012.
Z. NFRC 100 - Procedure for Determining Fenestration Product U-factors 2023.
AA. NFRC 201 - Procedure for Interim Standard Test Method for Measuring the Solar Heat Gain Coefficient of Fenestration Systems Using Calorimetry Hot Box Methods Current Edition.
BB. NFRC 202 - Procedure for Determining Translucent Fenestration Product Visible Transmittance at Normal Incidence Current Edition.
CC. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials Current Edition, Including All Revisions.
DD. UL 972 - Standard for Burglary Resisting Glazing Material Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
B. Product Data: Include construction details, material descriptions, profiles, span analysis data, and component finishes.
    1. Include full range of colors available for factory-finished, exposed aluminum.
C. Shop Drawings: Include plans, elevations, and details.
D. Samples:
    1. For each exposed finish required, matching thickness and material indicated for this work with size of 7 by 12 inches (178 by 305 mm).
    2. For factory-finished aluminum at 3 inches (76 mm) long.

E. Test Reports: Include the following product test reports from qualified independent testing agency indicating that each type and class of panel system complies with performance requirements indicated, based on comprehensive testing of these products. Reports completed for previous projects are also acceptable when for current manufacturer and relating to products used on this project.
   1. ICC-ES Acceptance Criteria; ICC-ES AC177.
   2. Flame Spread and Smoke Developed Index; UL 723.
   3. Rate and/or Extent and Time of Burning; ASTM D635.
   4. Color Difference; ASTM D2244.
   5. Burglary Resisting Glazing; UL 972.
   6. Bond Tensile Strength of Sandwich Construction; ASTM C297/C297M.
   7. Bond Shear Strength; ASTM D1002.
   8. Panel Beam Bending Strength; ASTM E72.
   9. Panel U-factor; NFRC 100.
   10. Visible Light Transmittance (VLT), Translucent; NFRC 202 or ASTM E972.
   11. Solar Heat Gain Coefficient (SHGC); NFRC 201 calculation.
   12. Condensation Resistance Factor; AAMA 1503.
   13. Air Leakage; ASTM E283/E283M.
   14. Structural Performance; ASTM E330/E330M.
   15. Water Penetration; ASTM E331.
   16. Fire Penetration of Exterior Wall Assemblies; ASTM E2707.
   17. Impacted by Missile and Cyclic Pressure Exposure; ASTM E1886.
   18. Windborne Debris in Hurricanes; ASTM E1996, or FBC TAS 201, FBC TAS 202 and FBC TAS 203.
   19. Window Performance; AAMA/WDMA/CSA 101/I.S.2/A440.
   20. Daylight Modeling Report.
F. Installation Instructions: Special installation requirements.
G. Manufacturer's qualification statement.
H. Installer's qualification statement.
I. Warranty Documentation: Manufacturer's sample warranty.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufactured material and products by company continuously and regularly employed in manufacture of specified materials for period of at least ten consecutive years, and with documented evidence of those materials being satisfactorily used on at least six projects of similar size, scope, and location, and at least three of these projects having been in successful use for ten years or longer.
   1. Listed panel system by certification agency complying with ISO/IEC 17065, that requires quality control inspections and fire, structural, and water infiltration testing of sandwich panel systems by accredited testing agency.
   2. Conduct quality control inspections at least once each year that include manufacturing facilities, sandwich panel components, and production sandwich panels to ensure product complies with ICC-ES AC177 requirements.
B. Installer Qualifications: Experienced installer that has been installing Kalwall panel systems for at least two consecutive years and that also provides documented evidence of satisfactory completion of projects of similar size, scope, and type.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver panel system, components and materials in manufacturer’s standard protective packaging.
B. Store panels on long edge above ground, blocked and under cover in accordance with manufacturer’s storage and handling instructions.
C. Handle products in accordance with manufacturer's written instructions.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
B. Provide manufacturer's and installer's written warranties agreeing to repair or replace panel system that fails in material or workmanship within 10 -years after Date of Substantial Completion. Failure of material or workmanship includes deterioration of finish on metal in excess of normal weathering; defects in accessories, insulated and translucent sandwich panels, and other components of this work.
C. Extended Panel Warranty:
    1. Provide 10-year limited warranty from Date of Substantial Completion covering delamination affecting structural strength, noticeable surface fiber exposure of exterior panel face, and abnormal color change of exterior face sheet.
    2. Provide 20-year limited warranty from Date of Delivery against external exposure of reinforcing glass fibers.
D. Extended Manufacturer’s Factory-Applied Finish Warranty: 10 years from Date of Delivery.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Kalwall Corporation. Other manufacturers may bid this project subject to compliance with performance requirements as indicated and required submittals. Listing other manufacturer's names in this specification does not constitute approval of their products or relieve them of compliance with performance requirements as indicated.

    Kalwall Corporation:
    Telephone: (800) 258-9777.
    Fax: (603) 627-7905.
    Email: info@kalwall.com.

B. Fiberglass-Sandwich-Panel Assemblies Manufacturers:
    1. Basis of Design: Kalwall Corporation; Facades - Translucent Wall Systems: www.kalwall.com/#sle.
    2. Subject to compliance with requirements, products of the following manufacturers are also approved:
        a. Major Industries, Inc: www.majorskylights.com.
    3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

A. Manufacturer responsible for configuration and fabrication of complete panel system.
B. Structural Wall Loads: Provide system capable of handling the following loads:
    1. See structural drawings for lateral load design factors.
    2. Allowable Deflection Ratio: L/60, maximum.
C. Air Leakage: Limit to allowable air leakage through panel system assembly with pressure difference across assembly at 6.24 psf (300 Pa) in accordance with ASTM E283/E283M.
D. Water Leakage: None, when measured in accordance with ASTM E331 at test-pressure difference of 15 psf (730 Pa).

E. Structural Performance Testing by Uniform Static Air Pressure Difference: Comply with ASTM E330/E330M.
F. Panel Beam Bending Strength: Less than 1.9 inch (48.3 mm) deflection at 30 psf (1.44 kPa) loading and 10 ft (3.05 m) span without supporting frame in accordance with ASTM E72 test method.
G. Windborne Debris Impact Resistance Performance: Missile Level A.
    1. Provide translucent panels complying with impact resistance requirements of ASTM E1886 and ASTM E1996; or FBC TAS 201, FBC TAS 202, and FBC TAS 203.
    2. Panel system to comply with applicable Missile Level A requirements in accordance with ASTM E1996 and authorities having jurisdiction (AHJ).
H. Exterior Face Sheet Strength: Uniform in strength and impenetrable by handheld pencil and as follows:
    1. Ball Impact Test: Pass, based on repelling impact without fracture or tear by at least 70 ft lbf (95 Nm) from 3-1/4 inch (82.6 mm) diameter 5 lb (2.3 kg) free-falling ball in accordance with UL 972 testing.
I. Fire Penetration Resistance of Wall Assembly: Panels comply with conditions of acceptance in accordance with ASTM E2707.
    1. Absence of flame penetration through wall assembly at any time.
    2. Absence of glowing combustion on interior surface of assembly at end of 60-minute observation period.
    3. Absence of flame, glow, and smoke when test is terminated prior to completion of 60-minute observation period.
J. Condensation Resistance Factor (CRF): Minimum of 80 when measured in accordance with AAMA 1503 on bond line of thermally broken panels with translucent insulation.
K. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 110 degrees F (43 degrees C) over 12-hour period without causing detrimental effect to system components.

2.03 COMPONENTS

A. Wall System: Sandwich panels of fiberglass-reinforced-plastic (FRP), translucent face sheets laminated to grid core with mechanically interlocking I-beams and straight adhesive bonding line that covers entire width of I-beam having neat, sharp edge, and protection of exterior face sheet provided with integral, embedded-glass erosion barrier.
    1. Panel Width: As indicated on drawings.
    2. Panel Length: As indicated on drawings.
    3. 2-3/4 inches (70 mm) Thick, Thermally Broken Composite I-Beam Grid Core: Thermoset fiberglass composite having I-beam grid core of 6063-T6 or 6005-T5 alloy and temper complying with ASTM B221 (ASTM B221M), with provisions for mechanical interlocking of muntin-mullion and perimeter, with minimum I-beam width of 1/2 inch (12.7 mm) and minimum I-beam thermal break of 1 inch (25.4 mm); poured and debridged thermal break is not permitted.
        a. Panel Type: Flat.
        b. Panel Fill Insulation:
            1) Fiberglass batt, medium level (Insulation Option #2).
        c. Thermal Transmittance (U-factor) of FRP Sandwich Panel: 0.14 (0.80), when tested in accordance with NFRC 100.
        d. FRP Face Sheet Color: Exterior - White/Interior - White.

e. Visible Light Transmission (VLT): For face sheet combination indicated and the following panel fill material, when tested in accordance with NFRC 202 or ASTM E972.
   1) Fiberglass Batt, Medium: 9 percent.
f. Solar Heat Gain Coefficient (SHGC): When tested in accordance with NFRC 201 at 0 degrees F (minus 18 degrees C) on cold side for face sheet combination indicated and following panel fill material.
   1) Fiberglass Batt, Medium: 0.11, nominal.
g. Grid Core Pattern:
   1) Verti-Kal: 8 inches (200 mm), wide.
   2) Ladder: 8 inches (200 mm), wide.
   3) Refer to Drawings for locations.

B. Face Sheets:
1. Translucent Face Sheets: Fabricated using glass fiber reinforced thermoset resins, and formulated specifically for architectural use.
   a. Use of thermoplastic, e.g., polycarbonate and acrylic, for face sheets is not permitted.
   b. Deformation, deflection, or dripping of face sheets upon exposure to fire is not permitted.
2. Exterior Face Sheet:
   a. Thickness: As required for system characteristics indicated; 0.070 inch (1.778 mm), minimum.
   b. Color as indicated under system description.
   c. Color Stability: Color of exterior face sheet to not change color more than three CIE Units DELTA E in accordance with ASTM D2244 after 5 years outdoors in South Florida weathering facing south; color stability not affected by abrasion or scratching.
3. Interior Face Sheet:
   a. Thickness: As required for system characteristics indicated; 0.045 inch (1.143 mm), minimum.
   b. Provide exposed surface of interior face sheets with following flame spread index (FSI) and smoke developed index (SDI) in compliance with ASTM E84 or UL 723.
      1) Class A: Flame spread index (FSI) of 25 or less and smoke developed index (SDI) of 200 or less.
   c. Provide Class CC1 face sheets with burning extent of 1 inch (25.4 mm) or less when tested in accordance with ASTM D635.

C. Laminate Adhesive: Provided for adhering translucent panel face sheets to grid core; heat and pressure resistant resin-type adhesive for use with structural sandwich panels and designed for at least 25 years of field use, and complying with testing requirements of ICC-ES AC05.
1. Tensile Strength: At least 750 psi (5.17 MPa) when panel assembly is tested in accordance with ASTM C297/C297M test method after two exposures to six cycles each of accelerated aging conditions complying with ASTM D1037.
2. Shear Strength: Panel adhesive complying with ASTM D1002 upon exposure to the following conditions:
   a. Exposed to 50 percent Relative Humidity (RH) at 68 degrees F (20 degrees C), minimum shear strength of 540 psi (3,723 kPa).
   b. Exposed to temperature of 182 degrees F (83 degrees C), minimum shear strength of 100 psi (689 kPa).
   c. Exposed to accelerated aging complying with ASTM D1037, minimum shear strength of 800 psi (5.52 MPa), tested at room temperature.
   d. Exposed to accelerated aging complying with ASTM D1037, minimum shear strength of 250 psi (1.72 MPa), tested at 182 degrees F (83 degrees C).

2.04 PERIMETER CLOSURE SYSTEM

A. Closure Aluminum Clamp-Tite Installation System:
   1. Thermally broken 'poured and debridged' structural polyurethane system consisting of extruded aluminum having 6063-T5 or 6063-T6 alloy and temper in compliance with ASTM B221 (ASTM B221M), and clamp-tite screw type closure system.
B. Water-Resistive Barriers: To suit application, nonbleeding and nonstaining; see Section 07 25 00.
C. Sealant for Within Translucent Assembly: As required by manufacturer; see Section 07 92 00.
D. Sealing Tape: Manufacturer's standard; factory applied to closure system under controlled conditions.
E. Fasteners: Stainless steel 300 Series screws for aluminum closures; excluding final fasteners to building.
F. Sill Flashing Sealant: Elastomeric, silicone, or polyurethane and compatible with flashing material; see Section 07 92 00.

2.05 WINDOWS

A. Manufacturers:
   1. Aluminum Windows for Translucent Wall Assemblies:
      a. Kalwall Corporation; HC-2000, Fixed - F-AW80 Windows: www.kalwall.com/#sle.
B. Provide windows designed for installation within translucent wall panel system and factory unitized to panels.
C. Comply with AAMA/WDMA/CSA 101/I.S.2/A440 performance requirements.
   1. Uniform Structural Load: 120 psf (5.75 kPa), minimum.
   2. Air Leakage: Limit air leakage through window assembly to 0.01 cfm per sq ft (0.05 L/sec sq m), with pressure difference across assembly of 6.24 psf (300 Pa) in accordance with ASTM E283/E283M.
   3. Water Leakage: None, when measured at test pressure difference of 12 psf (575 Pa).
D. Window Frame Construction: Extruded aluminum having 6063-T5 alloy and temper in compliance with ASTM B221 (ASTM B221M) with thermal break; frame sections coped and joined using stainless steel screws at each corner, weather-exposed joints sealed with elastic compound, and each opening is double weather-stripped using T-slot bulb gaskets to ensure minimal air infiltration.
   1. Size: As indicated on drawings.
   2. Provide inside-glazed, operable and fixed windows with an expanded EPDM closed-cell sponge gasket to exterior, with aluminum glazing bead and driven EPDM wedge gasket to interior for rapid removal and replacement.
   3. Aluminum Finish: To match adjacent translucent wall framing assembly.
E. Glazing: See Section 08 80 00, Type 1.

2.06 LOUVERS

A. Drainable Fixed Louver: 2-3/4 inch (70 mm) deep with blades at 45 degree slope and designed for use within translucent panel wall system and factory unitized to panels.
   1. Extruded aluminum frames and blades with 6063-T6 alloy and temper in compliance with ASTM B221 (ASTM B221M); minimum thickness of 0.081 inch (2.06 mm) with fully welded construction.
      a. Aluminum Finish: Match adjacent translucent wall framing assembly.
   2. Louver Blades Free Area: 40 percent, minimum.
   3. Louver Dimensions: As indicated on drawings

4. Bird Screens: Flat, 3/4-inch (19 mm) expanded aluminum screen, 0.051 inch (1.3 mm) thick, set in tubular extruded aluminum screen frame.
5. Blank-Off Plates: Aluminum, 0.063 inch (1.6 mm) thick.

2.07 FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 clear anodic coating not less than 0.7 mil, 0.0007 inch (0.018 mm) thick.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify substrates, supporting structure, and installation conditions.
B. Verify dimensions, tolerances, and method of attachment with other work.
C. Do not proceed with panel installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Metal Protection:
   1. At locations where aluminum contacts dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape as recommended by manufacturer for this purpose.
   2. At locations where aluminum contacts concrete, masonry, or pressure treated wood, protect against corrosion by painting contact surfaces with bituminous paint or method recommended by manufacturer.

3.03 INSTALLATION

A. Install panels within assembly in accordance with manufacturer's fabrication drawings and written installation instructions.
   1. Anchor component parts securely in place using permanent mechanical attachment system.
   2. Allow for thermal and mechanical movement of assembly components.
   3. Seal aluminum clamp-tite installation system as indicated on manufacturer’s fabrication drawings and written installation instructions.
B. Install joint sealants at perimeter joints and within panel assembly in accordance with manufacturer's fabrication drawings and written installation instructions; see Section 07 92 00.

3.04 CLEANING

A. Remove protective material from prefinished aluminum surfaces.
B. Wash down interior and exterior surfaces with solution of mild detergent in warm water, applied with soft, clean wiping cloths; remove dirt from corners and wipe surfaces clean.

3.05 PROTECTION

A. Protect finished work from damage until Date of Substantial Completion.

END OF SECTION 08 45 23

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Sliding doors.
3. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical door hardware.
3. Automatic operators.
4. Cylinders specified for doors in other sections.

C. Codes and References: Comply with the version year 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. UL/ULC and CSA C22.2 - Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
8. 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. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.
5. ANSI/UL 437- Key Locks.

1.3 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. Shop Drawings: Details of electrified access control hardware indicating the following:

1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

    a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
    b. Complete (risers, point-to-point) access control system block wiring diagrams.
    c. Wiring instructions for each electronic component scheduled herein.

2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. 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.

E. 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.

F. 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.

1.4 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. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
2. 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.

1.5 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".

1.6 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 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.

1.7 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

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

C. Please note that ASSA ABLOY is transitioning the Yale Commercial brand to Arrow. This affects only the brand name; the products and product numbers will remain unchanged. The

brand transition is expected to be complete in or about May of 2024, and products shipping after that time will be branded Arrow.

D. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 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 the all out-swinging lockable doors.

5. Manufacturers:

a. Hager Companies (HA) - BB Series, 5 knuckle.
b. McKinney (MK) - TA/T4A Series, 5 knuckle.
c. dormakaba Best (ST) - F/FBB Series, 5 knuckle.

2.3 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. Where specified, provide modular continuous geared hinges that ship in two or three pieces and form a single continuous hinge upon installation.
2. Manufacturers:.

    a. Hager Companies (HA).
    b. Pemko (PE).
    c. Dormakaba Best (ST).

B. Pin and Barrel Continuous Hinges: ANSI/BHMA A156.26 Grade 1-600 pin and barrel continuous hinges with minimum 14 gauge Type 304 stainless steel hinge leaves, concealed stainless pin, and twin self-lubricated nylon bearings at each knuckle separation. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:

    a. Markar Products; ASSA ABLOY Architectural Door Accessories (MR).
    b. Pemko (PE).
    c. Dormakaba Best (ST).

2.4 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. Pemko (PE) - EL-CEPT Series.
    b. Securitron (SU) - EL-CEPT Series.
    c. Dormakaba Best (ST) EPT-12C 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. Hager Companies (HA) - Quick Connect.
    b. McKinney (MK) - QC-C Series.
    c. Dormakaba Best (ST) - WH Series.

2.5 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. Ives (IV).
    b. Rockwood (RO).
    c. Trimco (TC).

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. Ives (IV).
    b. Rockwood (RO).
    c. Trimco (TC).

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. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. 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.

4. Pulls, where applicable, shall be provided with a 10” clearance from the finished floor on the push side to accommodate wheelchair accessibility.
5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
6. Manufacturers:

    a. Ives (IV).
    b. Rockwood (RO).
    c. Trimco (TC).

2.6 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.

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: Manufacturer’s 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. Corbin Russwin (RU) - Access 3 AP.
    b. Medeco (MC) - X4.
    c. 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. New System: Key locks to a new key system as directed by the Owner.

F. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
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.

2.7 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).

2.8 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 features and functionality as specified herein.

1. Electromechanical locksets shall have the following features and functionality:

a. Electromechanical locksets shall be provided with universal Molex plug-in connectors that have standardized color-coded wiring and be available 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 deadbolt monitoring.
d. Two-year limited warranty on electrified functions.

2. Manufacturers:

a. Corbin Russwin Hardware (RU) - ML2000 Series.
b. Sargent Manufacturing (SA) - 8200 Series.
c. Schlage (SC) - L9000 Series.

2.9 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 panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

1. Manufacturers:

a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
b. Sargent Manufacturing (SA) - 80 Series.
c. Von Duprin (VD) - 35A/98 XP Series.

C. Steel Removable Mullions: ANSI/BHMA A156.3 steel removable mullions with options for fire rating, locking, through-wire electrification and hurricane compliance as specified.

1. Manufacturers:

a. Same as exit device manufacturer.

2.11 ELECTROMECHANICAL EXIT DEVICES

A. Electromechanical Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices subject to same compliance standards and requirements as mechanical exit devices. Electrified exit devices to be of type and design as specified below and in the hardware sets.

1. Energy Efficient Design: Provide devices which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
2. Where conventional power supplies are not sufficient, include any specific controllers required to provide the proper inrush current.
3. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.
4. Manufacturers:

a. Corbin Russwin Hardware (RU) - ED5000 Series.
b. Sargent Manufacturing (SA) - 80 Series.
c. Von Duprin (VD) - 35A/98 XP Series.

2.12 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. 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.
4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
6. 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. Heavy duty surface mounted door closers shall have a 30-year warranty.
2. Manufacturers:

a. LCN Closers (LC) - 4040 Series.
b. Norton Rixson (NO) - 7500 Series.
c. Sargent Manufacturing (SA) - 351 Series.

C. Door Closers, Surface Mounted (Unitrol): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted closers with door stop mechanism to absorb dead stop shock on arm and top hinge. Hold-open arms to have a spring loaded mechanism in addition to shock absorber assembly. Arms to be provided with rigid steel main arm and secondary arm lengths proportional to the door width.

1. Manufacturers:

a. Arrow, formerly known as Yale (YA) - Unitrol Series.
b. Corbin Russwin Hardware (RU) - Unitrol Series.

c. Norton Rixson (NO) - Unitrol Series.

D. Door Closers, Overhead Concealed Double Acting (Heavy Duty): Center pivot, double acting ANSI/BHMA 156.4 Grade 1 Certified Products Directory (CPD) overhead door closers. UL Listed and ADA-compliant for interior or exterior doors up to 250 lbs. Closers are non-handed, with adjustable spring strength, hydraulic back check, and two closing speed adjustments for sweep and latch. Latch speed can be independently adjustable per door direction. Cast iron body construction with 1-1/4" dual pistons and an optional hold open feature. Closer bodies shall fit in a 1-3/4" x 4" metal or aluminum transom and 2-1/2" x 4-1/2" wood frame.

1. Manufacturers:

a. dormakaba (DO) - RTS88 Series.
b. LCN Closers (LC) - 6030 Series.
c. Norton Rixson (RF) - 73 Series.

2.13 ELECTROHYDRAULIC DOOR OPERATORS

A. Electrohydraulic Door Operators (High Traffic): Provide ANSI/BHMA A156.19 Certified Products Directory (CPD) listed low energy operators that meet ANSI/BHMA A156.4 requirements and are UL listed for use on fire rated doors and UL10C certified that comply with requirements for the Americans with Disabilities Act (ADA). Operators shall be verified by GreenCircle to offer energy savings of 19% when compared to similar products to accommodate openings up 250 pounds and 48” wide.

1. Provide operators with features as follows:

a. Non-handed with push and pull side mounting.
b. Operates as mechanical surface closer during close cycles, when door is opened manually or if power is off.
c. Activation by push button, hands-free or radio frequency devices.
d. On board electronics to collect usage and cycle count data to facilitate preventative maintenance/diagnostics.
e. Two-year limited warranty.
f. Mounting backplate to simplify and speed up installation.

2. Operators shall have the following functionality:

a. Adjustable Hold Open: Amount of time a door will stay in the full open position after an activation.
b. Blow Open for Smoke Ventilation: Door opens when signal is received from alarm system allowing air or smoke to flow through opening. Door will stay open until signal from alarm system is stopped.
c. Infinite Hold Open: Door will hold open at set position until power is turned off.
d. Obstruction Detection: Door closes if it hits an obstruction while opening; door will reverse to open position if it hits an obstruction while closing. Door will stop once it hits an obstruction and will rest against the obstruction until removed.
e. Open Delay: Delays operator opening for locking hardware.

f. Overload Safety Shut-Off: After two minutes of receiving a door activation signal, inverter times out and door closes to prevent motor/inverter damage.
g. Presence Detector Input: Input for external sensor to detect presence at door open or close position only.
h. Push & Go: As the door is manually opened, the operator "senses" movement and opens door to the full-open position.
i. Selector Mode Switch: Off disables the signal inputs unless Blow Open is activated, on activates the signal inputs, hold open activates the unit (unless Blow Closed is activated) to the hold open position.
j. Vestibule Delay: When the wall switch is pressed, first door in vestibule will open. Second door will open once vestibule door delay has expired. Delay is adjustable.

3. Manufacturers:

a. Gyrotech Nabco - GT500 Series.
b. LCN (LC) - 4630/4640 Series.
c. Norton Rixson (NO) - 6000 Series.

2.14 SURFACE MOUNTED CLOSER HOLDERS

A. Electromagnetic Door Holders: ANSI A156.15 electromagnetic door holder/releases with a minimum 20 to 40 pounds holding power and single coil construction able to accommodate.12VDC, 24VAC, 24VDC and 120VAC. Coils to be independently wound, employing an integral fuse and armatures to include a positive release button.

1. Manufacturers:

a. LCN Door Closers (LC) - SEM7800 Series.
b. Norton Rixson (RF) - 980/990 Series.
c. Sargent Manufacturing (SA) - 1560 Series.

2.15 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:

a. Stainless Steel: 300 grade, 050-inch thick.

5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:

a. Ives (IV).
b. Rockwood (RO).
c. Trimco (TC).

2.16 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. 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. Ives (IV).
b. Rockwood (RO).
c. Trimco (TC).

C. 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 (RF).
b. Rockwood (RO).
c. Sargent Manufacturing (SA).

2.17 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 NPFA 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. Pemko (PE).
2. Reese Enterprises, Inc. (RE).
3. Zero (ZE).

2.18 ELECTRONIC ACCESSORIES

A. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.

1. Manufacturers:

a. Sargent Manufacturing (SA) - 3280 Series.
b. Security Door Controls (SD) - DPS Series.
c. Securitron (SU) - DPS Series.

B. Intelligent Switching Power Supplies: Provide power supplies with single, dual or multi-voltage configurations at 12 and/or 24VDC. Power Supply shall have battery backup function with an integrated battery charging circuit. The power supply shall have a standard, integrated Fire Alarm Interface (FAI). The power supply shall provide capability for secondary voltage, power distribution, direct lock control and network monitoring through add on modules. The power supply shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs. Network modules shall provide remote monitoring functions such as status reporting, fault reporting and information logging.

1. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

2. Manufacturers:

a. Securitron (SU) - AQL Series.
b. Altronix (AS) - Maximal 11F.
c. Life Safety Power (LSP)

2.19 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.

2.20 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

3.1 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.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 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. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

E. 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.

3.4 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.

3.5 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.

3.6 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.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The 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. Refer to Section 080671, Door Hardware Sets, for hardware sets.

END OF SECTION

SECTION 08 71 06 - DOOR HARDWARE SCHEDULE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 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 “Integrated Door Opening Assemblies”.
2. Division 08 Section “Door Hardware”.

D. Codes and References: Comply with the version year 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.

1.3 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.

1.4 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".

1.5 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.

1.6 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

2.1 SCHEDULED DOOR HARDWARE

A. Refer to “PART 3 – EXECUTION” for required specification sections.

PART 3 - EXECUTION

3.1 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 17 00 – Integrated Door Opening Assemblies.
2. Section 08 71 00 – Door Hardware.

C. Manufacturer's Abbreviations:

1. MK - McKinney
2. MR - Markar
3. PE - Pemko
4. SU - Securitron
5. RO - Rockwood
6. SA - SARGENT
7. OT - Other
8. RI - RITE Door
9. MC - Medeco
10. HS - HES
11. RF - Rixson
12. NO - Norton
13. LU - Lund Equipment Co

Hardware Sets

Set: 1.0

Doors: D100B-2, F100A-1

2	Continuous Hinge	CFM-SLF-HD1 PT		PE	087100	
2	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1	Mullion	L980A	US28	SA	087100	
1	Rim Exit Device, Exit Only	16 43 55 56 63 8810 EO	US32D	SA	087100	⚡
1	Rim Exit Device, Storeroom	16 43 55 56 63 8804 Less Pull	US32D	SA	087100	⚡
1	Cylinder	60 980C1	US26D	SA	087100	
4	Interchangeable Core	322401_ GMK	26	MC	087100	
2	Pull	RM201 Mtg-Type 12XHD	US32D-316	RO	087100	
2	Conc Overhead Stop	6-X36	630	RF	087100	
2	Surface Closer	J7500 x mounting plate to suit application	689	NO	087100	
1	Weatherstrip	- Integral within construction of door and frame assembly		OT	08 4113	
2	Sweep	29326CNB TKSP		PE	087100	
1	Threshold	1715AK MSES25SS		PE	087100	
2	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100	⚡
2	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	087100	⚡
1	Card Reader	- Provided by Security Contractor		OT	281300	⚡
2	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Power Supply	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Doors normally closed and locked.
Presentation of valid credential at card reader retracts exit device latch bolts allowing ingress.
Door position switches to monitor / report open closed status of opening to security system.
Exit devices equipped with request to exit switches at rail to shunt door monitoring at egress.
Free egress at all times.
Fail-secure.

Set: 2.0

Doors: A101-2, C100E-2, E101-1

2	Continuous Hinge	CFM-SLF-HD1 PT		PE	087100	
2	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1	Mullion	L980A	US28	SA	087100	
1	Rim Exit Device, Exit Only	16 43 55 56 63 8810 EO	US32D	SA	087100	⚡
1	Rim Exit Device, Storeroom	16 43 53 55 56 63 8804 Less Pull	US32D	SA	087100	⚡
1	Cylinder	60 980C1	US26D	SA	087100	
4	Interchangeable Core	322401_ GMK	26	MC	087100	
2	Pull	RM201 Mtg-Type 12XHD	US32D-316	RO	087100	
2	Conc Overhead Stop	6-X36	630	RF	087100	
1	Surface Closer	J7500 x mounting plate to suit application	689	NO	087100	
1	Automatic Opener	6021 / 6031 x D - confirm head detail	689	NO	087100	⚡
1	Weatherstrip	- Integral within construction of door and frame assembly		OT	08 4113	
2	Sweep	29326CNB TKSP		PE	087100	
1	Threshold	1715AK MSES25SS		PE	087100	
2	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100	⚡
2	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	087100	⚡
1	Card Reader	- Provided by Security Contractor		OT	281300	⚡
1	Door Switch	505 - wall mount		NO	087100	⚡
1	Door Switch	504 - vestibule		NO	087100	⚡
2	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Power Supply	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Doors normally closed and locked.
Presentation of valid credential at card reader retracts exit device latch bolts allowing ingress.
Door position switches to monitor and report open / closed status of opening to buildings access control system.
Exit devices equipped with request to exit switches at rail to shunt door monitoring upon egress.
Free egress at all times.

Fail-secure.

Activating actuator switch retracts latch bolt of exit device, if locked, and initiates automatic operator cycle.
Activating exterior actuator switch initiates cycle of automatic operator if the latch bolt is in the retracted position (push /pull operation).

After hours - access by valid use of card reader outside / automatic operator will only operate if card reader is authorized first.

Set: 3.0

Doors: A101-1, C100E-1, E101-2, E101-3, E101-4

2	Continuous Hinge	CFM-SLF-HD1 PT		PE	087100	
2	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1	Mullion	L980A	US28	SA	087100	
2	Rim Exit Device, Exit Only	16 43 55 56 63 8810 EO	US32D	SA	087100	⚡
1	Cylinder	60 980C1	US26D	SA	087100	
3	Interchangeable Core	322401_ GMK	26	MC	087100	
2	Pull	RM201 Mtg-Type 12XHD	US32D-316	RO	087100	
2	Conc Overhead Stop	6-X36	630	RF	087100	
2	Surface Closer	J7500 x mounting plate to suit application	689	NO	087100	
1	Weatherstrip	- Integral within construction of door and frame assembly		OT	08 4113	
2	Sweep	29326CNB TKSP		PE	087100	
1	Threshold	1715AK MSES25SS		PE	087100	
2	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100	⚡
2	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	087100	⚡
2	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Power Supply	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Doors to be on lock / unlock schedule per the buildings access control system.
Door position switches to monitor / report open closed status of opening to security system.
Exit devices equipped with request to exit switches at rail to shunt door monitoring at egress.
Free egress at all times.
Fail-secure.

Set: 5.0

Doors: B114B-1, B114C2-2, E103-7

1	Continuous Hinge	CFM-SLF-HD1 PT		PE	087100	
1	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1	Rim Exit Device, Storeroom	16 43 55 56 63 8804 Less Pull	US32D	SA	087100	⚡
2	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Pull	RM201 Mtg-Type 12XHD	US32D-316	RO	087100	
1	Conc Overhead Stop	6-X36	630	RF	087100	
1	Surface Closer	J7500 x mounting plate to suit application	689	NO	087100	
1	Weatherstrip	- Integral within construction of door and frame assembly		OT	08 4113	
1	Sweep	29326CNB TKSP		PE	087100	
1	Threshold	1715AK MSES25SS		PE	087100	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100	⚡
1	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	087100	⚡
1	Card Reader	- Provided by Security Contractor		OT	281300	⚡
1	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Power Supply	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Doors normally closed and locked.

Presentation of valid credential at card reader retracts exit device latch bolts allowing ingress.
Door position switches to monitor / report open closed status of opening to security system.
Exit devices equipped with request to exit switches at rail to shunt door monitoring at egress.
Free egress at all times.
Fail-secure.

Set: 6.0

Doors: ST1-1, ST2-1, ST3-2, ST4-1

2	Continuous Hinge	CFM-SLF-HD1-M		PE	087100	
1	Mullion	L980A	US28	SA	087100	
1	Rim Exit Device, Storeroom	16 43 60 8804 Less Pull	US32D	SA	087100	
1	Rim Exit Device, Exit Only	16 43 60 8810 EO	US32D	SA	087100	
4	Interchangeable Core	322401_ GMK	26	MC	087100	
2	Pull	RM201 Mtg-Type 12XHD	US32D-316	RO	087100	
2	Conc Overhead Stop	6-X36	630	RF	087100	
2	Surface Closer	J7500 x mounting plate to suit application	689	NO	087100	
1	Weatherstrip	- Integral within construction of door and frame assembly		OT	08 4113	
2	Sweep	29326CNB TKSP		PE	087100	
1	Threshold	1715AK MSES25SS		PE	087100	
2	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Door position switches to monitor / report open closed status of opening to security system.

Set: 7.0

Doors: A102-1, A102-4, D101-1, D101-4

2	Continuous Hinge	CFM-SLF-HD1-M		PE	087100
2	Concealed Vert Rod Exit, Classroom	CPC 43 60 AD8613 ETL *NC-E35*	US32D	SA	087100

2	Interchangeable Core	322401_ GMK	26	MC	087100	
2	Conc Overhead Stop	6-X36	630	RF	087100	
2	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Weatherstrip	- Integral within construction of door and frame assembly		OT	08 4113	
2	Sweep	29326CNB TKSP		PE	087100	
1	Threshold	1715AK MSES25SS		PE	087100	
2	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Door position switches to monitor / report open closed status of opening to security system.

Set: 8.0

Doors: C100B, D104K, E100A, E104E-2, E104G-2, E110-2, E112-2, E114-2, F101-3

2	Continuous Hinge	CFM-HD1 PT		PE	087100	
2	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1	Mullion	L980S	PC	SA	087100	
1	Rim Exit Device, Exit Only	16 43 55 56 63 8810 EO	US32D	SA	087100	⚡
1	Rim Exit Device, Storeroom	16 43 55 56 63 8804 Less Pull	US32D	SA	087100	⚡
1	Cylinder	60 980C1	US26D	SA	087100	
4	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Vandal Resistant Trim	VRT22	US32D	RO	087100	
1	Vandal Resistant Trim	VRT22 C	US32D	RO	087100	
2	Surface Closer	UNI7500	689	NO	087100	
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
2	Astragal	316APK TKSP8		PE	087100	
1	Gasketing	2891APK TKSP8		PE	087100	

1	Rain Guard	346C TKSP8		PE	087100
2	Door Bottom	216AFG TKSP		PE	087100
1	Threshold	252x3AFG Pemkote MSES25SS		PE	087100
2	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100
2	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	087100
1	Card Reader	- Provided by Security Contractor		OT	281300
2	Door Position Switch	- Provided by Security Contractor		OT	281300
1	Power Supply	- Provided by Security Contractor		OT	281300
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT	

Notes:

Doors normally closed and locked.
Presentation of valid credential at card reader retracts exit device latch bolts allowing ingress.
Door position switches to monitor / report open closed status of opening to security system.
Exit devices equipped with request to exit switches at rail to shunt door monitoring at egress.
Free egress at all times.
Fail-secure.

Set: 9.0

Doors: C101-1, C101-2, C118-1, C120-1, C124-1, D110-1, D114-1, D116-1, E106-2, E110A-2, F103B-2, F114B

1	Continuous Hinge	CFM-HD1 PT		PE	087100
1	Electric Power Transfer	EL-CEPT	630	SU	087100
1	Rim Exit Device, Storeroom	16 43 55 56 63 8804 Less Pull	US32D	SA	087100
2	Interchangeable Core	322401_ GMK	26	MC	087100
1	Vandal Resistant Trim	VRT22 C	US32D	RO	087100
1	Surface Closer	UNI7500	689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Gasketing	2891APK TKSP8		PE	087100
1	Rain Guard	346C TKSP8		PE	087100
1	Door Bottom	216AFG TKSP		PE	087100

1	Threshold	252x3AFG Pemkote MSES25SS		PE	087100
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100
1	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	087100
1	Card Reader	- Provided by Security Contractor		OT	281300
1	Door Position Switch	- Provided by Security Contractor		OT	281300
1	Power Supply	- Provided by Security Contractor		OT	281300
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT	

Notes:

Door normally closed and locked.
Presentation of valid credential at card reader retracts exit device latch bolt allowing ingress.
Door position switch to monitor / report open closed status of opening to security system.
Exit device equipped with request to exit switch at rail to shunt door monitoring at egress.
Free egress at all times.
Fail-secure.

Set: 10.0

Doors: F101-4

2	Continuous Hinge	CFM-HD1-M		PE	087100
1	Mullion	L980S	PC	SA	087100
1	Rim Exit Device, Storeroom	16 43 60 8804 Less Pull	US32D	SA	087100
1	Rim Exit Device, Exit Only	16 43 60 8810 EO	US32D	SA	087100
1	Cylinder	60 980C1	US26D	SA	087100
4	Interchangeable Core	322401_ GMK	26	MC	087100
1	Vandal Resistant Trim	VRT22	US32D	RO	087100
1	Vandal Resistant Trim	VRT22 C	US32D	RO	087100
2	Surface Closer	UNI7500	689	NO	087100
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
2	Astragal	316APK TKSP8		PE	087100
1	Gasketing	2891APK TKSP8		PE	087100

1	Rain Guard	346C TKSP8		PE	087100	
2	Door Bottom	216AFG TKSP		PE	087100	
1	Threshold	252x3AFG Pemkote MSES25SS		PE	087100	
2	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Door position switches to monitor / report open closed status of opening to security system.

Set: 11.0

Doors: E106-3

1	Continuous Hinge	CFM-HD1 PT		PE	087100	
1	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1	Fail Secure Lock	RX 63 8271 LNL	US26D	SA	087100	⚡
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surface Closer	UNI7500	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Gasketing	2891APK TKSP8		PE	087100	
1	Rain Guard	346C TKSP8		PE	087100	
1	Door Bottom	216AFG TKSP		PE	087100	
1	Threshold	252x3AFG Pemkote MSES25SS		PE	087100	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100	⚡
1	ElectroLynx Harness	QC-C (power transfer to lock or electric strike location)		MK	087100	⚡
1	Card Reader	- Provided by Security Contractor		OT	281300	⚡
1	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Power Supply	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Door normally closed and locked.
Presentation of valid credential at card reader retracts exit device latch bolt allowing ingress.
Door position switch to monitor / report open closed status of opening to security system.
Exit device equipped with request to exit switch at rail to shunt door monitoring at egress.
Free egress at all times.
Fail-secure.

Set: 12.0

Doors: A234-2

1	Continuous Hinge	CFM-HD1-M		PE	087100	
1	Storeroom/Closet Lock	60 8204 LNL	US26D	SA	087100	
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
1	Gasketing	2891APK TKSP8		PE	087100	
1	Rain Guard	346C TKSP8		PE	087100	
1	Door Bottom	216AFG TKSP		PE	087100	
1	Threshold	252x3AFG Pemkote MSES25SS		PE	087100	
1	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Door position switch to monitor / report open closed status of opening to security system.

Set: 12.0A

1	Continuous Hinge	CFM-HD1-M		PE	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
1	Gasketing	2891APK TKSP8		PE	087100	

1	Rain Guard	346C TKSP8		PE	087100	
1	Door Bottom	216AFG TKSP		PE	087100	
1	Threshold	252x3AFG Pemkote MSES25SS		PE	087100	

Set: 13.0

Doors: B228-2, C201B, D214B

1	Continuous Hinge	CFM-HD1-M		PE	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
1	Gasketing	2891APK TKSP8		PE	087100	
1	Rain Guard	346C TKSP8		PE	087100	
1	Door Bottom	216AFG TKSP		PE	087100	
1	Threshold	252x3AFG Pemkote MSES25SS		PE	087100	

Set: 14.0

Doors: B114D

1	Continuous Hinge	CFM-HD1-M		PE	087100	
1	Storeroom/Closet Lock	60 8204 LNL	US26D	SA	087100	
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surface Closer	UNI7500	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Gasketing	2891APK TKSP8		PE	087100	
1	Rain Guard	346C TKSP8		PE	087100	
1	Door Bottom	216AFG TKSP		PE	087100	
1	Threshold	252x3AFG Pemkote MSES25SS		PE	087100	
1	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Door position switch to monitor / report open closed status of opening to security system.

Set: 14.0A

1	Continuous Hinge	CFM-HD1-M		PE	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surface Closer	UNI7500	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Gasketing	2891APK TKSP8		PE	087100	
1	Rain Guard	346C TKSP8		PE	087100	
1	Door Bottom	216AFG TKSP		PE	087100	
1	Threshold	252x3AFG Pemkote MSES25SS		PE	087100	

Set: 15.0

Doors: C220

1	Continuous Hinge	CFM-HD1-M		PE	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surface Closer	UNI7500	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Gasketing	2891APK TKSP8		PE	087100	
1	Rain Guard	346C TKSP8		PE	087100	
1	Door Bottom	216AFG TKSP		PE	087100	
1	Threshold	252x3AFG Pemkote MSES25SS		PE	087100	

Set: 16.0

Doors: A101-4, C100E-4

2	Continuous Hinge	CFM-SLF-HD1 PT		PE	087100	
2	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1	Mullion	L980A	US28	SA	087100	
1	Rim Exit Device, Exit Only	16 43 55 56 63 8810 EO	US32D	SA	087100	⚡
1	Rim Exit Device, Storeroom	16 43 53 55 56 63 8804 Less Pull	US32D	SA	087100	⚡
1	Cylinder	60 980C1	US26D	SA	087100	

4	Interchangeable Core	322401_ GMK	26	MC	087100	
2	Pull	RM201 Mtg-Type 12XHD	US32D-316	RO	087100	
2	Conc Overhead Stop	6-X36	630	RF	087100	
1	Surface Closer	J7500 x mounting plate to suit application	689	NO	087100	
1	Automatic Opener	6021 / 6031 x D - confirm head detail	689	NO	087100	⚡
2	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100	⚡
2	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	087100	⚡
1	Card Reader	- Provided by Security Contractor		OT	281300	⚡
1	Door Switch	505 - wall mount		NO	087100	⚡
2	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Power Supply	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Doors normally closed and locked.
Presentation of valid credential at card reader retracts exit device latch bolts allowing ingress.
Door position switches to monitor / report open closed status of opening to security system.
Exit devices equipped with request to exit switches at rail to shunt door monitoring at egress.
Free egress at all times.
Fail-secure.

Activating actuator switch retracts latch bolt of exit device, if locked, and initiates automatic operator cycle.
Activating exterior actuator switch initiates cycle of automatic operator if the latch bolt is in the retracted position (push /pull operation).

Set: 17.0

Doors: A101-3, C100E-3

2	Continuous Hinge	CFM-SLF-HD1 PT		PE	087100

2	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1	Mullion	L980A	US28	SA	087100	
2	Rim Exit Device, Exit Only	16 43 55 56 63 8810 EO	US32D	SA	087100	⚡
1	Cylinder	60 980C1	US26D	SA	087100	
3	Interchangeable Core	322401_ GMK	26	MC	087100	
2	Pull	RM201 Mtg-Type 12XHD	US32D-316	RO	087100	
2	Conc Overhead Stop	6-X36	630	RF	087100	
2	Surface Closer	J7500 x mounting plate to suit application	689	NO	087100	
2	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100	⚡
2	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	087100	⚡
2	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Power Supply	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Doors to be on lock / unlock schedule per the buildings access control system.
Door position switches to monitor / report open closed status of opening to security system.
Exit devices equipped with request to exit switches at rail to shunt door monitoring at egress.
Free egress at all times.
Fail-secure.

Set: 18.0

2	Continuous Hinge	CFM-SLF-HD1-M		PE	087100
2	Push Bar	8893	US32D	SA	087100
2	Pull	RM201 Mtg-Type 12XHD	US32D-316	RO	087100
2	Conc Overhead Stop	6-X36	630	RF	087100
2	Surface Closer	J7500 x mounting plate to suit application	689	NO	087100

Set: 19.0

2	Continuous Hinge	CFM-SLF-HD1-M		PE	087100	
2	Push Bar	8893	US32D	SA	087100	
2	Pull	RM201 Mtg-Type 12XHD	US32D-316	RO	087100	
2	Conc Overhead Stop	6-X36	630	RF	087100	
1	Surface Closer	J7500 x mounting plate to suit application	689	NO	087100	
1	Automatic Opener	6021 / 6031 x D - confirm head detail	689	NO	087100	⚡
1	Door Switch	505 - wall mount		NO	087100	⚡

Set: 19.1

Doors: E101-5, E101-6, E103-1, E103-3, E103-4

2	Continuous Hinge	CFM-SLF-HD1-M		PE	087100	
2	Concealed Vert Rod Exit, Classroom	NB 43 60 AD8613 ETL	US32D	SA	087100	
2	Interchangeable Core	322401_ GMK	26	MC	087100	
2	Conc Overhead Stop	6-X36	630	RF	087100	
2	Surface Closer	J7500 x mounting plate to suit application	689	NO	087100	

Set: 20.0

Doors: B228-1, E104L-2, E104M-2, E112-1

3	Hinge (heavy weight)	T4A3786	US26D	MK	087100	
1	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1	Rim Exit Device, Storeroom	12 43 55 56 63 8804 ETL	US32D	SA	087100	⚡
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surface Closer	PR7500	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
1	Gasketing	S88BL		PE	087100	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100	⚡
1	ElectroLynx Harness	QC-C (power transfer to exit device lever trim)		MK	087100	⚡

1	Card Reader	- Provided by Security Contractor		OT	281300	⚡
1	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Power Supply	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Door normally closed and locked.
Presentation of valid credential at card reader retracts exit device latch bolt allowing ingress.
Door position switch to monitor / report open closed status of opening to security system.
Exit device equipped with request to exit switch at rail to shunt door monitoring at egress.
Free egress at all times.
Fail-safe.

Set: 21.0

Doors: D100C-1

6	Hinge (heavy weight)	T4A3786	US26D	MK	087100	
2	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1	Mullion	L980S	PC	SA	087100	
1	Rim Exit Device, Storeroom	43 55 56 63 8804 ETL	US32D	SA	087100	⚡
1	Rim Exit Device, Dummy	43 55 56 8810 ETL	US32D	SA	087100	⚡
1	Interchangeable Core	322401_ GMK	26	MC	087100	
2	Surface Closer	PR7500	689	NO	087100	
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
2	Door Stop	400 / 441CU	US26D	RO	087100	
2	Silencer	608 / 609		RO	087100	
2	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100	⚡
2	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	087100	⚡
1	Card Reader	- Provided by Security Contractor		OT	281300	⚡

2	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Power Supply	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Doors normally closed and locked.
Presentation of valid credential at card reader retracts exit device latch bolts allowing ingress.
Door position switches to monitor / report open closed status of opening to security system.
Exit devices equipped with request to exit switches at rail to shunt door monitoring at egress.
Free egress at all times.
Fail-secure.

Set: 22.0

Doors: B107H, B114B-2, C114, D112, E104E-1, E104E-3, E104L-1, E104M-1, E110-1, E114

3	Hinge (heavy weight)	T4A3786	US26D	MK	087100	
1	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1	Rim Exit Device, Storeroom	43 55 56 63 8804 ETL	US32D	SA	087100	⚡
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surface Closer	PR7500	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100	⚡
1	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	087100	⚡
1	Card Reader	- Provided by Security Contractor		OT	281300	⚡
1	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Power Supply	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Doors normally closed and locked.
Presentation of valid credential at card reader retracts exit device latch bolts allowing ingress.
Door position switches to monitor / report open closed status of opening to security system.
Exit devices equipped with request to exit switches at rail to shunt door monitoring at egress.
Free egress at all times.
Fail-secure.

Set: 23.0

Doors: A250-2, B238-1, B246-2

3	Hinge (heavy weight)	T4A3786	US26D	MK	087100	
1	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1	Rim Exit Device, Storeroom	43 55 56 63 8804 ETL	US32D	SA	087100	⚡
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surface Closer	CPS7500T	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100	⚡
1	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	087100	⚡
1	Card Reader	- Provided by Security Contractor		OT	281300	⚡
1	Power Supply	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Doors normally closed and locked.
Presentation of valid credential at card reader retracts exit device latch bolts allowing ingress.
Door position switches to monitor / report open closed status of opening to security system.
Exit devices equipped with request to exit switches at rail to shunt door monitoring at egress.
Free egress at all times.
Fail-secure.

Set: 24.0

Doors: A110-2, A112-1, A202-1, A202-2, A240-1, A240-2, A250-1, B107C-1, B114-1, B114-2, B238-2,

B240-1, B240-2, B242-1, B242-2, B244-1, B244-2, B246-1, C102E-1, C102E-2, C102K-1, C118-2, C120-2, C124, D101-2, D101Q-1, D102C1-1, D102C1-2, D102C2-1, D102C2-2, D103, D106-1, D106-2, D110B, D114B, D116-2, F132-2, F133-2

3	Hinge (heavy weight)	T4A3786	US26D	MK	087100	
1	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1	Rim Exit Device, Storeroom	43 55 56 63 8804 ETL	US32D	SA	087100	⚡
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surface Closer	PR7500H	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100	⚡
1	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	087100	⚡
1	Card Reader	- Provided by Security Contractor		OT	281300	⚡
1	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Power Supply	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Doors normally closed and locked.
Presentation of valid credential at card reader retracts exit device latch bolts allowing ingress.
Door position switches to monitor / report open closed status of opening to security system.
Exit devices equipped with request to exit switches at rail to shunt door monitoring at egress.
Free egress at all times.
Fail-secure.

Set: 25.0

Doors: E104A1, E104A2

4	Hinge (heavy weight)	T4A3786	US26D	MK	087100	
1	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡

1	Rim Exit Device, Storeroom	43 55 56 63 8804 ETL	US32D	SA	087100	⚡
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surface Closer	CPS7500	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100	⚡
1	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	087100	⚡
1	Card Reader	- Provided by Security Contractor		OT	281300	⚡
1	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Power Supply	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Doors normally closed and locked.
Presentation of valid credential at card reader retracts exit device latch bolts allowing ingress.
Door position switches to monitor / report open closed status of opening to security system.
Exit devices equipped with request to exit switches at rail to shunt door monitoring at egress.
Free egress at all times.
Fail-secure.

Set: 26.0

Doors: A242-1, A242-2, A248-1, A248-2, D101Q-2, D105-1, E104B-1, E104C-1, E105-4

3	Hinge (heavy weight)	T4A3786	US26D	MK	087100	
1	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1	Rim Exit Device, Storeroom	12 43 55 56 63 8804 ETL	US32D	SA	087100	⚡
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surface Closer	PR7500	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	

1	Door Stop	400 / 441CU	US26D	RO	087100	
1	Gasketing	S88BL		PE	087100	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100	⚡
1	ElectroLynx Harness	QC-C (power transfer to exit device rail)		MK	087100	⚡
1	Card Reader	- Provided by Security Contractor		OT	281300	⚡
1	Power Supply	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Doors normally closed and locked.
Presentation of valid credential at card reader retracts exit device latch bolts allowing ingress.
Door position switches to monitor / report open closed status of opening to security system.
Exit devices equipped with request to exit switches at rail to shunt door monitoring at egress.
Free egress at all times.
Fail-secure.

Set: 27.0

Doors: F132-1, F133-1

6	Hinge (heavy weight)	T4A3786	US26D	MK	087100
1	Mullion	L980S	PC	SA	087100
1	Rim Exit Device, Storeroom	43 60 8804 ETL	US32D	SA	087100
1	Rim Exit Device, Exit Only	43 8810 EO	US32D	SA	087100
1	Cylinder	60 980C1	US26D	SA	087100
2	Interchangeable Core	322401_ GMK	26	MC	087100
2	Surface Closer	PR7500H	689	NO	087100
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
2	Door Stop	400 / 441CU	US26D	RO	087100
2	Silencer	608 / 609		RO	087100

Set: 28.0

Doors: A100-1, A200B-1, A200D-2, B100A-2, B200A-1, B200C, C100A, D100A

8	Hinge (heavy weight)	T4A3786	US26D	MK	087100	
2	Concealed Vert Rod Exit, Exit Only	NB 43 MD8610 EO	US32D	SA	087100	
2	Surface Closer	PR7500	689	NO	087100	
4	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
2	Electromagnetic Holder	994M	689	RF	087100	⚡
2	Silencer	608 / 609		RO	087100	

Notes:

Doors to be normally held open on door / wall mounted magnetic hold open devices.
Magnetic hold open devices to release at activation of fire alarm or emergency lockdown.

Set: 29.0

Doors: F101-1, F101-2, F101-5

8	Hinge (heavy weight)	T4A3786	US26D	MK	087100
1	Mullion	L980S	PC	SA	087100
2	Rim Exit Device, Classroom	43 60 8813 ETL	US32D	SA	087100
1	Cylinder	60 980C1	US26D	SA	087100
3	Interchangeable Core	322401_ GMK	26	MC	087100
2	Surface Closer	CPS7500T	689	NO	087100
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
2	Silencer	608 / 609		RO	087100

Set: 30.0

Doors: E104J-2

6	Hinge (heavy weight)	T4A3786	US26D	MK	087100
1	Mullion	12-L980	PC	SA	087100
2	Rim Exit Device, Classroom	12 43 60 8813 ETL	US32D	SA	087100
1	Cylinder	60 980C1	US26D	SA	087100
3	Interchangeable Core	322401_ GMK	26	MC	087100

2	Surface Closer	PR7500	689	NO	087100
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
2	Door Stop	400 / 441CU	US26D	RO	087100
1	Astragal	S772C		PE	087100
1	Gasketing	S88BL		PE	087100

Set: 30.1

Doors: B107H-1

3	Hinge (heavy weight)	T4A3786	US26D	MK	087100
1	Rim Exit Device, Classroom	43 60 8813 ETL	US32D	SA	087100
1	Interchangeable Core	322401_ GMK	26	MC	087100
1	Surface Closer	PR7500	689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Door Stop	400 / 441CU	US26D	RO	087100
3	Silencer	608 / 609		RO	087100

Set: 30.2

Doors: B107J

3	Hinge (heavy weight)	T4A3786	US26D	MK	087100
1	Rim Exit Device, Classroom	43 60 8813 ETL	US32D	SA	087100
1	Interchangeable Core	322401_ GMK	26	MC	087100
1	Surface Closer	CPS7500	689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
3	Silencer	608 / 609		RO	087100

Set: 33.0

Doors: D100C-1, D100C-2, E100A-2, F100A-3, ST1-2, ST2-2, ST2-3, ST3-1, ST3-3, ST4-2

6	Hinge (heavy weight)	T4A3786	US26D	MK	087100
2	Concealed Vert Rod Exit, Passage	12 NB 43 MD8615 ETL	US32D	SA	087100
2	Surface Closer	PR7500	689	NO	087100

2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
2	Door Stop	400 / 441CU	US26D	RO	087100	
2	Electromagnetic Holder	994M	689	RF	087100	
1	Astragal	S772C		PE	087100	
1	Gasketing	S88BL		PE	087100	

Notes:

Doors to be normally held open on door / wall mounted magnetic hold open devices.
Magnetic hold open devices to release at activation of fire alarm or emergency lockdown.

Set: 34.0

Doors: E104J-1

6	Hinge (heavy weight)	T4A3786	US26D	MK	087100
1	Mullion	L980S	PC	SA	087100
2	Rim Exit Device, Passage	43 8815 ETL	US32D	SA	087100
1	Cylinder	60 980C1	US26D	SA	087100
1	Interchangeable Core	322401_ GMK	26	MC	087100
2	Surface Closer	PR7500	689	NO	087100
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
2	Door Stop	400 / 441CU	US26D	RO	087100
2	Silencer	608 / 609		RO	087100

Set: 35.0

Doors: E104G-1

8	Hinge (heavy weight)	T4A3786	US26D	MK	087100
1	Mullion	L980S	PC	SA	087100
2	Rim Exit Device, Passage	43 8815 ETL	US32D	SA	087100
1	Cylinder	60 980C1	US26D	SA	087100
1	Interchangeable Core	322401_ GMK	26	MC	087100
2	Surface Closer	PR7500	689	NO	087100
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100

2	Door Stop	400 / 441CU	US26D	RO	087100	
2	Silencer	608 / 609		RO	087100	

Set: 36.0

Doors: B102-4, F121

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1	Fail Secure Lock	RX 63 8271 LNL	US26D	SA	087100	⚡
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100	⚡
1	ElectroLynx Harness	QC-C (power transfer to lock or electric strike location)		MK	087100	⚡
1	Card Reader	- Provided by Security Contractor		OT	281300	⚡
1	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Power Supply	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Door normally closed and locked.
Presentation of valid credential at card reader unlocks electric lock allowing ingress.
Door position switch to monitor / report open closed status of opening to security system.
Electric lock equipped with request to exit switch at interior lever to shunt door monitoring at egress.
Free egress at all times.
Fail-secure.

Set: 37.0

Doors: B102-2

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Electric Power	EL-CEPT	630	SU	087100	⚡

	Transfer					
1	Fail Secure Lock	RX 63 8271 LNL	US26D	SA	087100	⚡
1	Mortise Deadlock	60 4875	US26D	SA	087100	
2	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100	⚡
1	ElectroLynx Harness	QC-C (power transfer to lock or electric strike location)		MK	087100	⚡
1	Card Reader	- Provided by Security Contractor		OT	281300	⚡
1	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Remote Release	- Provided by Security Contractor		OT	281300	
1	Power Supply	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Door normally closed and locked.
Presentation of valid credential at card reader or remote release unlocks electric lock allowing ingress to corridor.
Door position switch to monitor / report open closed status of opening to security system.
Electric lock equipped with request to exit switch at interior lever to shunt door monitoring at egress.
Free egress to office from corridor at all times.
Fail-secure.

Deadbolt to be used to secure office for after hours functions.

Set: 38.0

Doors: B102-1

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1	Fail Secure Lock	RX 63 8271 LNL	US26D	SA	087100	⚡
1	Interchangeable Core	322401_ GMK	26	MC	087100	

1	Surf Overhead Stop	10-X36	630	RF	087100	
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)		MK	087100	⚡
1	ElectroLynx Harness	QC-C (power transfer to lock or electric strike location)		MK	087100	⚡
1	Card Reader	- Provided by Security Contractor		OT	281300	⚡
1	Intercom	- Provided by Security Contractor		OT	281300	
1	Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1	Remote Release	- Provided by Security Contractor		OT	281300	
1	Power Supply	- Provided by Security Contractor		OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Door normally closed and locked.
Presentation of valid credential at card reader or intercom / remote release unlocks electric lock allowing ingress.
Door position switch to monitor / report open closed status of opening to security system.
Electric lock equipped with request to exit switch at interior lever to shunt door monitoring at egress.
Free egress at all times.
Fail-secure.

Set: 39.0

Doors: E107

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Electric Power Transfer	EL-CEPT	630	SU	087100	⚡
1	Fail Secure Lock	RX 63 8271 LNL	US26D	SA	087100	⚡
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surf Overhead Stop	10-X36	630	RF	087100	
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Gasketing	S88BL		PE	087100	
1	ElectroLynx Harness	QC-C1500P (power transfer or		MK	087100	⚡

	electric strike to junction box above)				
1 ElectroLynx Harness	QC-C (power transfer to lock or electric strike location)		MK	087100	⚡
1 Card Reader	- Provided by Security Contractor		OT	281300	⚡
1 Door Position Switch	- Provided by Security Contractor		OT	281300	⚡
1 Power Supply	- Provided by Security Contractor		OT	281300	⚡
1 Wiring Diagram	- Elevation and Point to Point as Specified		OT		

Notes:

Door normally closed and locked.
Presentation of valid credential at card reader unlocks electric lock allowing ingress.
Door position switch to monitor / report open closed status of opening to security system.
Electric lock equipped with request to exit switch at interior lever to shunt door monitoring at egress.
Free egress at all times.
Fail-secure.

Set: 41.0

Doors: A103, A113, A119, A125, A211, A222, A223, A225, A232, A233, A236, A238, B105, B108, B213, B215, B218, B234, C106, C112, C116, C125, C224B, D101K, D108, D114G, D114H, E104F-2, E106C, E106D, E106E, E108, F118, F119

3 Hinge, Full Mortise	TA2714	US26D	MK	087100	
1 Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1 Surface Closer	7500 - pull side mount	689	NO	087100	
1 Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1 Door Stop	400 / 441CU	US26D	RO	087100	
3 Silencer	608 / 609		RO	087100	
1 Coat Hook	796	US26D	RO	087100	

Set: 42.0

Doors: A110, A212, B106, B208, D102D-1, D102D-2

3 Hinge, Full Mortise	TA2714	US26D	MK	087100	
1 Wireless Access Control Mortise	- XS4 Series (Salto)	26D	OT	087100	⚡

	Lock				
1	Surface Closer	PR7500	689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Door Stop	400 / 441CU	US26D	RO	087100
3	Silencer	608 / 609		RO	087100
1	Coat Hook	796	US26D	RO	087100

Set: 43.0

Doors: A202B

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surf Overhead Stop	10-X36	630	RF	087100	
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	Coat Hook	796	US26D	RO	087100	

Set: 44.0

Doors: C201B, E104K, E110A-1

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
1	Gasketing	S88BL		PE	087100	
1	Coat Hook	796	US26D	RO	087100	

Set: 45.0

Doors: E103D, E103E

6	Hinge, Full Mortise	TA2714	US26D	MK	087100	

1	Flush Bolt	2845 / 2945	US26D	RO	087100	
1	Dust Proof Strike	570	US26D	RO	087100	
1	Storeroom/Closet Lock	60 8204 LNL	US26D	SA	087100	
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Coordinator	2672	US28	RO	087100	
2	Surface Closer	7500 - pull side mount	689	NO	087100	
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
2	Door Stop	400 / 441CU	US26D	RO	087100	
1	Astragal	S772C		PE	087100	
1	Gasketing	S88BL		PE	087100	

Set: 46.0

Doors: A104B, A105, A106J, A107B, A108, A123, A201, B101E, B102D, B102L, B116D-1, B216, C102G, D114G, F127

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Storeroom/Closet Lock	60 8204 LNL	US26D	SA	087100	
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	

Set: 46.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	Coat Hook	796	US26D	RO	087100	

Set: 47.0

Doors: B217, B227, C101-5, C102C, E102

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Storeroom/Closet Lock	60 8204 LNL	US26D	SA	087100	
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surface Closer	7500H	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	

Set: 47.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surface Closer	7500H	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	Coat Hook	796	US26D	RO	087100	

Set: 48.0

Doors: A109, A127-1, A127C1-1, A203, A204-1, A205, A206, A207, A208, A214, A216, A218, A224, A226, A227, A228, A229, A230, A231, B109, B201, B202, B203, B204, B205, B207, B210, B212, B214, B220, B221, B222, B223, B224, B225, B226

3	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Storeroom/Closet Lock	60 8204 LNL	US26D	SA	087100
1	Interchangeable Core	322401_ GMK	26	MC	087100
1	Surface Closer	PR7500H	689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Door Stop	400 / 441CU	US26D	RO	087100

3	Silencer	608 / 609		RO	087100	

Set: 48.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surface Closer	PR7500H	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	Coat Hook	796	US26D	RO	087100	

Set: 50.0

Doors: C103

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Storeroom/Closet Lock	60 8204 LNL	US26D	SA	087100	
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surf Overhead Stop	10-X36	630	RF	087100	
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
3	Silencer	608 / 609		RO	087100	

Set: 50.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surf Overhead Stop	10-X36	630	RF	087100	
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
3	Silencer	608 / 609		RO	087100	

1	Coat Hook	796		US26D	RO	087100

Set: 51.0

Doors: A244, B107-2

3	Hinge, Full Mortise	TA2714		US26D	MK	087100
1	Storeroom/Closet Lock	60 8204 LNL		US26D	SA	087100
1	Interchangeable Core	322401_ GMK		26	MC	087100
1	Surface Closer	7500 - pull side mount		689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV		US32D	RO	087100
1	Door Stop	400 / 441CU		US26D	RO	087100
1	Gasketing	S88BL			PE	087100

Set: 51.0A

3	Hinge, Full Mortise	TA2714		US26D	MK	087100
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)		26D	OT	087100
1	Surface Closer	7500 - pull side mount		689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV		US32D	RO	087100
1	Door Stop	400 / 441CU		US26D	RO	087100
1	Gasketing	S88BL			PE	087100
1	Coat Hook	796		US26D	RO	087100

Set: 52.0

Doors: A104, A106, A107, B101B, B101V, B116, D100B-3, E101-7

3	Hinge, Full Mortise	TA2714		US26D	MK	087100
1	Office/Entry Lock	60 8205 LNL		US26D	SA	087100
1	Interchangeable Core	322401_ GMK		26	MC	087100
1	Surface Closer	PR7500		689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV		US32D	RO	087100
1	Door Stop	400 / 441CU		US26D	RO	087100

3	Silencer	608 / 609		RO	087100	

Set: 52.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	
1	Surface Closer	PR7500	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	Coat Hook	796	US26D	RO	087100	

Set: 53.0

Doors: F126

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Office/Entry Lock	60 8205 LNL	US26D	SA	087100	
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surf Overhead Stop	10-X36	630	RF	087100	
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
3	Silencer	608 / 609		RO	087100	

Set: 53.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	
1	Surf Overhead Stop	10-X36	630	RF	087100	
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	Coat Hook	796	US26D	RO	087100	

Set: 54.0

Doors: D101-1

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Office/Entry Lock	60 8205 LNL	US26D	SA	087100	
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surf Overhead Hold Open	10-X26	630	RF	087100	
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
3	Silencer	608 / 609		RO	087100	

Set: 54.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surf Overhead Hold Open	10-X26	630	RF	087100	
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	Coat Hook	796	US26D	RO	087100	

Set: 55.0

Doors: B114A2-1, B114A2-2

3	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Passage Latch	8215 LNL	US26D	SA	087100
1	Conc Overhead Stop	2-X36	630	RF	087100
3	Silencer	608 / 609		RO	087100

Set: 55.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100
1	Surf Overhead Stop	10-X36	630	RF	087100
1	Surface Closer	7500 - pull side mount	689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
3	Silencer	608 / 609		RO	087100
1	Coat Hook	796	US26D	RO	087100

Set: 56.0

Doors: C101D, C118D, D114F, D116F

6	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Flush Bolt	2805 / 2905	US26D	RO	087100
1	Classroom Lock	60 8237 LNL	US26D	SA	087100
1	Interchangeable Core	322401_ GMK	26	MC	087100
2	Door Stop	400 / 441CU	US26D	RO	087100
2	Silencer	608 / 609		RO	087100

Set: 57.0

Doors: A104C, A104D, A104F, A106C, A106D, A106K-1, A106K-2, A107A, A107H, A110B, A110D, A127E, A127G, A202C, A246-1, A246-2, B101U, B102C, B102G-1, B102M, B102N-2, B107F, B107G-1, B112A, B112C, B114B1, B114B2, B114E, B114F, B114H, B114J, B116E, C102D, C102J, C122-2, C122-3, C124D, D101L, D101N, D102E-1, D102E-2, D102F-1, D102F-2, D103, D104E, D105D, D106C, D114-3, D114E, D116D, D116E, E105G, E105H, E105K, E105L-1, E106B, F116, F117

3	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Classroom Lock	60 8237 LNL	US26D	SA	087100
1	Interchangeable Core	322401_ GMK	26	MC	087100
1	Door Stop	400 / 441CU	US26D	RO	087100
3	Silencer	608 / 609		RO	087100

Set: 57.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100

1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surface Closer	7500 - pull side mount / PR7500	690	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	Coat Hook	796	US26D	RO	087100	

Set: 58.0

Doors: A202D

3	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Classroom Lock	60 8237 LNL	US26D	SA	087100
1	Interchangeable Core	322401_ GMK	26	MC	087100
1	Door Stop	400 / 441CU	US26D	RO	087100
1	Gasketing	S773BL		PE	087100
1	Gasketing	S44BL		PE	087100
1	Gasketing	ACP112BL/2		PE	087100
1	Door Bottom	STC411APK		PE	087100

Set: 58.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surface Closer	7500 - pull side mount / PR7500	690	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	Coat Hook	796	US26D	RO	087100	

Set: 59.0

Doors: A104H, A127B1, A127B2, A220, B101D, B102N-1, B107G-2, B114G, B114K, B114L

3	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Classroom Lock	60 8237 LNL	US26D	SA	087100
1	Interchangeable Core	322401_ GMK	26	MC	087100
1	Conc Overhead Stop	2-X36	630	RF	087100
3	Silencer	608 / 609		RO	087100

Set: 59.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100
1	Surface Closer	7500 - pull side mount / PR7500	690	NO	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Door Stop	400 / 441CU	US26D	RO	087100
3	Silencer	608 / 609		RO	087100
1	Coat Hook	796	US26D	RO	087100

Set: 60.0

Doors: D104

3	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Classroom Lock	60 8237 LNL	US26D	SA	087100
1	Interchangeable Core	322401_ GMK	26	MC	087100
1	Surface Closer	7500 - pull side mount	689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Door Stop	400 / 441CU	US26D	RO	087100
3	Silencer	608 / 609		RO	087100

Set: 61.0

Doors: A110A, A112C2, A127C1, A204-2, B114C1-1, B114C2-1, B114C3-1, C101C, C118C, C120C, C124C, D101C-1, D105C, D110C, D110E, D114C, D116C, E105-1, E105-3

3	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Classroom Lock	60 8237 LNL	US26D	SA	087100

1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surface Closer	7500H	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	

Set: 62.0

Doors: D114K-1, D114K-2

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Classroom Lock	60 8237 LNL	US26D	SA	087100	
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surface Closer	CPS7500	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
3	Silencer	608 / 609		RO	087100	

Set: 63.0

Doors: A127-2, C102H

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Classroom Lock	60 8237 LNL	US26D	SA	087100	
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
1	Gasketing	S88BL		PE	087100	

Set: 63.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	

1	Door Stop	400 / 441CU	US26D	RO	087100
1	Gasketing	S88BL		PE	087100
1	Coat Hook	796	US26D	RO	087100

Set: 64.0

Doors: E106-1

6	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Flush Bolt	2845 / 2945	US26D	RO	087100
1	Dust Proof Strike	570	US26D	RO	087100
1	Classroom Security Intruder Lock	60 8238 LNL	US26D	SA	087100
2	Interchangeable Core	322401_ GMK	26	MC	087100
1	Coordinator	2672	US28	RO	087100
2	Mounting Bracket	2601AB / 2601C	US28	RO	087100
2	Surface Closer	PR7500	689	NO	087100
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Door Stop	400 / 441CU	US26D	RO	087100
1	Astragal	S772C		PE	087100
1	Gasketing	S88BL		PE	087100
3	Silencer	608 / 609		RO	087100

Set: 65.0

Doors: A104G, A106A, A106B, A107C, A107D, A107E, A107F, A107G, A107J, A202A, B101F, B101G, B101H, B101J, B101N, B101P, B101Q, B101R, B101S, B101T, B102F, B102G-2, B102H, B110-1, B110-2, B112, B112B, B112D, B112E, B116D-2, B116F, B116G, B116H, D101M, D104F, F115, F123, F125

3	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Classroom Security Intruder Lock	60 8238 LNL	US26D	SA	087100
2	Interchangeable Core	322401_ GMK	26	MC	087100
1	Door Stop	400 / 441CU	US26D	RO	087100
3	Silencer	608 / 609		RO	087100

Set: 65.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	
1	Surface Closer	7500 - pull side mount / PR7500	690	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	Coat Hook	796	US26D	RO	087100	

Set: 66.0

Doors: A121, A221, B103, B114A, B211, B213

3	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Storeroom Deadbolt Lock	LB V21 60 8251 LNL	US26D	SA	087100
1	Interchangeable Core	322401_ GMK	26	MC	087100
1	Surface Closer	7500 - pull side mount	689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Door Stop	400 / 441CU	US26D	RO	087100
3	Silencer	608 / 609		RO	087100
1	Coat Hook	796	US26D	RO	087100

Set: 66.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	Coat Hook	796	US26D	RO	087100	

Set: 67.0

Doors: A219

3	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Storeroom Deadbolt Lock	LB V21 60 8251 LNL	US26D	SA	087100
1	Interchangeable Core	322401_ GMK	26	MC	087100
1	Surf Overhead Stop	10-X36	630	RF	087100
1	Surface Closer	7500 - pull side mount	689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
3	Silencer	608 / 609		RO	087100
1	Coat Hook	796	US26D	RO	087100

Set: 67.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surf Overhead Stop	10-X36	630	RF	087100	
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	Coat Hook	796	US26D	RO	087100	

Set: 68.0

Doors: B101K, B101L, B102H-1, D102A1, D102A2, D106A, E105A, F115A, F122A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Privacy Lock	LB V21 8265 LNL	US26D	SA	087100
1	Door Stop	400 / 441CU	US26D	RO	087100
3	Silencer	608 / 609		RO	087100
1	Coat Hook	796	US26D	RO	087100

Set: 68.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100

1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surface Closer	7500 - pull side mount / PR7500	690	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	Coat Hook	796	US26D	RO	087100	

Set: 69.0

Doors: D105A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Privacy Lock	LB V21 8265 LNL	US26D	SA	087100
1	Conc Overhead Stop	2-X36	630	RF	087100
3	Silencer	608 / 609		RO	087100
1	Coat Hook	796	US26D	RO	087100

Set: 69.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surface Closer	7500 - pull side mount / PR7500	690	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	
1	Coat Hook	796	US26D	RO	087100	

Set: 70.0

Doors: A104-1, A104A-2, A106H, A110C, B101A, B102A, B104, B107A1, B107A2, C101A, C102A1, C102A2, C118A, C120A, C124A, D101A1, D101A2, D110A, D114A, D116A, E106A, F129

3	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Privacy Lock	LB V21 8265 LNL	US26D	SA	087100
1	Surface Closer	7500 - pull side mount	689	NO	087100

1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Door Stop	400 / 441CU	US26D	RO	087100
3	Silencer	608 / 609		RO	087100
1	Coat Hook	796	US26D	RO	087100

Set: 70.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100
1	Surface Closer	7500 - pull side mount	689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
1	Door Stop	400 / 441CU	US26D	RO	087100
3	Silencer	608 / 609		RO	087100
1	Coat Hook	796	US26D	RO	087100

Set: 71.0

Doors: A127A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Privacy Lock	LB V21 8265 LNL	US26D	SA	087100
1	Surf Overhead Stop	10-X36	630	RF	087100
1	Surface Closer	7500 - pull side mount	689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
3	Silencer	608 / 609		RO	087100
1	Coat Hook	796	US26D	RO	087100

Set: 71.0A

3	Hinge, Full Mortise	TA2714	US26D	MK	087100
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100
1	Surf Overhead Stop	10-X36	630	RF	087100
1	Surface Closer	7500 - pull side mount	689	NO	087100
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
3	Silencer	608 / 609		RO	087100

1	Coat Hook	796		US26D	RO	087100

Set: 72.0

Doors: B102-3

6	Hinge, Full Mortise	TA2714		US26D	MK	087100
2	Single Dummy Trim	8295 LNL		US26D	SA	087100
2	Roller Latch	592		US26D	RO	087100
2	Door Stop	400 / 441CU		US26D	RO	087100
2	Silencer	608 / 609			RO	087100

Set: 73.0

Doors: A124, F102

3	Hinge (heavy weight)	T4A3786		US26D	MK	087100
1	Storeroom/Closet Lock	60 8204 LNL		US26D	SA	087100
1	Interchangeable Core	322401_ GMK		26	MC	087100
1	Armor Plate	K1050 36" high CSK BEV		US32D	RO	087100
1	Door Stop	400 / 441CU		US26D	RO	087100
3	Silencer	608 / 609			RO	087100

Set: 73.0A

3	Hinge (heavy weight)	T4A3786		US26D	MK	087100
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)		26D	OT	087100
1	Interchangeable Core	322401_ GMK		26	MC	087100
1	Surface Closer	7500 - pull side mount / PR7500		690	NO	087100
1	Armor Plate	K1050 36" high CSK BEV		US32D	RO	087100
1	Door Stop	400 / 441CU		US26D	RO	087100
3	Silencer	608 / 609			RO	087100

Set: 74.0

Doors: C102-2

3	Hinge (heavy weight)	T4A3786	US26D	MK	087100	
1	Office/Entry Lock	60 8205 LNL	US26D	SA	087100	
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	

Set: 75.0

Doors: C102B, D101B1, D101B2, E101A, E101B, E105B, F105A-1, F111A-1, F120, F128B

3	Hinge (heavy weight)	T4A3786	US26D	MK	087100	
1	Push Plate	70E	US32D-316	RO	087100	
1	Pull Plate	BF 111x70B	US32D	RO	087100	
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	

Set: 75.0A

3	Hinge (heavy weight)	T4A3786	US26D	MK	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surface Closer	7500 - pull side mount	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	

Set: 76.0

Doors: F103B-1, F107B, F109B, F114B-1

3	Hinge (heavy weight)	T4A3786	US26D	MK	087100	
1	Push Plate	70E	US32D-316	RO	087100	
1	Pull Plate	BF 111x70B	US32D	RO	087100	
1	Surface Closer	PR7500	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	

Set: 76.0A

3	Hinge (heavy weight)	T4A3786	US26D	MK	087100	
1	Wireless Access Control Mortise Lock	- XS4 Series (Salto)	26D	OT	087100	⚡
1	Surface Closer	PR7500	689	NO	087100	
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100	
1	Door Stop	400 / 441CU	US26D	RO	087100	
3	Silencer	608 / 609		RO	087100	

Set: 77.0

Doors: E105D

2	Push Plate	70E	US32D-316	RO	087100
1	Concealed Closer	73_	689	RF	087100
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO	087100
2	Door Stop	400 / 441CU	US26D	RO	087100

Set: 78.0

Doors: A100.2, A200B-2, A200D-1, B100A-2, B200A-2, B200B, C100B, D100B-1, D100C-3, D114N, E100B, F100A-2, ST1-3, ST4-3

2	Continuous Hinge	FM200	Gray Powder Coat Primer	MR	087100
2	Recessed Exit	D3676 MEC	US32D	RI	081700
2	Trim	D3080-01 LC	US32D	RI	
2	Mortise Cylinder	60 43	US32D	SA	087100
2	Interchangeable Core	322401_ GMK	26	MC	087100

2	Surface Closer	D-DCT-351PKT90	EN	RI	081700	
2	Electromagnetic Holder	D-MDH-310	689	RI	081700	⚡
1	Seal Kit	D-SS-STK-CLR	Clear	RI	081700	

Notes:

Doors to be normally held open on door / wall mounted magnetic hold open devices.
Magnetic hold open devices to release at activation of fire alarm or emergency lockdown.

Set: 79.0

Doors: G04, G05, G06, G07, G09, G10, G11

2	Rim Exit Device, Classroom	CPC 43 60 8813 ETL *NC-E35*	US32D	SA	087100
2	Interchangeable Core	322401_ GMK	26	MC	087100

Notes:

Coordinate mounting of exit device with gate manufacturer.

Set: 79.1

Doors: G02, G03, G08

1	Rim Exit Device, Classroom	CPC 43 60 8813 ETL *NC-E35*	US32D	SA	087100
1	Interchangeable Core	322401_ GMK	26	MC	087100

Notes:

Coordinate mounting of exit device with gate manufacturer.

Set: 79.2

Doors: G01

1	Rim Exit Device, Storeroom	CPC 43 64 8804 ETL *NC-E35*	US32D	SA	087100	
1	Interchangeable Core	322401_ GMK	26	MC	087100	
1	Electric Strike	9600	630	HS	087100	⚡

1	SMART Pac Bridge Rectifier	2005M3	HS	087100	⚡
1	ElectroLynx Harness	QC-C1500P (power transfer or electric strike to junction box above)	MK	087100	⚡
1	ElectroLynx Harness	QC-C (power transfer to lock or electric strike location)	MK	087100	⚡
1	Card Reader	- Provided by Security Contractor	OT	281300	⚡
1	Door Position Switch	- Provided by Security Contractor	OT	281300	⚡
1	Power Supply	- Provided by Security Contractor	OT	281300	⚡
1	Wiring Diagram	- Elevation and Point to Point as Specified	OT		

Notes:

Coordinate mounting of exit device with gate manufacturer.

Gate normally closed and locked.
Presentation of valid credential at card reader unlocks electric strike allowing ingress.
Free egress at all times.
Fail-secure.

Set: 80.0

Doors: MISC

1	Repair Kit	QC-R001	MK	087100	⚡
1	Crimp Tool	QC-R003	MK	087100	⚡
1	Key Cabinet	1200 Series x Mounting Brackets & Capacity as Required	LU		

Set: 81.0

Doors: E101-8, E103-2, E103-3

1	Hardware	TBD	OT	087100

END OF SECTION 080671

SECTION 08 80 00
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Insulating glass units.
- B. Glazing units.
- C. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS
- A. Section 07 92 00 - Joint Sealants: Sealants for other than glazing purposes.
- B. Section 08 11 13 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.
- C. Section 08 14 16 - Flush Wood Doors: Glazed lites in doors.
- D. Section 08 41 26 - All-Glass Entrances and Storefronts: Glazing furnished as part of entrance assembly.
- E. Section 08 43 13 - Aluminum-Framed Storefronts: Glazing furnished as part of storefront assembly.
- F. Section 08 44 13 - Glazed Aluminum Curtain Walls: Glazing furnished as part of wall assembly.
- G. Section 08 87 23 - Safety and Security Films applied to glazing.

1.03 SUBMITTALS
- A. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- B. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- C. Samples: Submit two samples 12 by 12 inch (304 by 304 mm) in size of glass units.
- D. Certificate: Certify that products of this section meet or exceed specified requirements.
- E. 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. Perform Work in accordance with IGMA TM-3000 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.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

1.05 MOCK-UPS
- A. See Section 01 40 00 - Quality Requirements, for additional mock-up requirements.
- B. Provide on-site glazing mock-up with the specified glazing components. See Section 04 20 00 .

1.06 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.

1.07 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
B. Insulating Glass Units: Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.
C. Laminated Glass: Provide a ten (10) year manufacturer warranty to include coverage for delamination, including replacement of failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Float Glass Manufacturers:
    1. Guardian Industries Corp: www.sunguardglass.com.
    2. Pilkington North America Inc: www.pilkington.com/na.
    3. PPG Industries, Inc: www.ppgideascapes.com.
    4. Substitutions: Refer to Section 01 60 00 - Product Requirements.
B. Fire-Resistance-Rated Glass: Provide products as required to achieve indicated fire-rating period.
    1. Manufacturers:
        a. SAFTIFIRST, a division of O'Keeffe's Inc: www.safti.com/#sle.
        b. Technical Glass Products: www.fireglass.com/#sle.
        c. Substitutions: Refer to Section 01 60 00 - Product Requirements.
C. Fire-Protection-Rated Glass: Provide products as required to achieve indicated fire-rating period.
    1. Manufacturers:
        a. SAFTIFIRST, a division of O'Keeffe's Inc: www.safti.com/#sle.
        b. Technical Glass Products: www.fireglass.com/#sle.
        c. Substitutions: Refer to Section 01 60 00 - 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. 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.
    4. Glass thicknesses listed are minimum.
B. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
    1. In conjunction with vapor retarder and joint sealer materials described in other sections.
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 6.3 computer program.
    2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 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 noted otherwise.
   1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
   2. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and FT.
   3. Fully Tempered Safety Glass: Complies with ANSI Z97.1 and 16 CFR 1201 criteria.
   4. Impact Resistant Safety Glass: Complies with ANSI Z97.1 and 16 CFR 1201 criteria; Class A/Category II.
   5. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
   1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class A or 16 CFR 1201 - Category II impact test requirements.
   2. Polyvinyl Butyral (PVB) Interlayer: 0.030 inch (0.762 mm) thick, minimum.

2.04 BASIS OF DESIGN - INSULATING GLASS UNITS

A. Type 1 - Vision glazing, with Low-E coating.
   1. Applications: Exterior insulating glass glazing unless otherwise indicated.
   2. Space between lites filled with argon.
   3. Total Thickness: 1 inch (25.4 mm).
   4. Thermal Transmittance (U-Value): 0.24, nominal.
   5. Visible Light Transmittance (VLT): 62 percent, nominal.
   6. Solar Heat Gain Coefficient (SHGC): 0.27, nominal.
   7. Warm-Edge Spacers: Low conductivity thermoplastic and stainless steel.
      a. Spacer Width: As required for specified insulating glass unit.
   8. Spacer Color: Dark gray.
   9. 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.
   10. Basis of Design - Guardian Glass, LLC: www.guardianglass.com.
   11. Outboard Lite: Annealed float glass, 1/4 inch (6.4 mm) thick, minimum.
      a. Low-E Coating: SunGuard SNX 62/27 on #2 surface.
   12. Inboard Lite: Annealed float glass, 1/4 inch (6.4 mm) thick.
      a. Coating: No coating on inboard lite.
      b. Glass: Clear.

B. Type 1A -Sealed Insulating Glass Units: Safety glazing:
   1. Applications: Provide this type of glazing in the following locations:
      a. Glazed lites in exterior doors.
      b. Glazed sidelights and panels next to doors.
      c. Other locations required by applicable federal, state, and local codes and regulations.
      d. Other locations indicated on the drawings.
   2. Type: Same as Type 1 except use fully tempered float glass for both outboard and inboard lites.

C. Type 1B -Sealed Insulating Glass Units: Obscure glazing:
   1. Applications: Provide this type of glazing in the following locations:
      a. Other locations indicated on the drawings.
   2. Type: Same as Type 1 except use patterned obscure glass for inboard lite. Both inboard and outboard lites shall be laminated glass.
      a. Pattern: No. 62

D. Type 1C -Sealed Insulating Glass Units: Safety/Security glazing:
   1. Applications: Provide this type of glazing in the following locations:
      a. Glazed lites in exterior doors in secure vestibukes.
      b. Glazed sidelights and panels next to doors in secure vestibules.
      c. Other locations required by applicable federal, state, and local codes and regulations.
      d. Other locations indicated on the drawings.
   2. Type: Same as Type 1 except:
      a. Use fully tempered glass for outboard lite.
      b. Use 1/2 inch laminated safety glass for inboard lite.
      c. Total thickness: 1-1/4 inches.
   3. Safety and Security Film: See Section 08 87 23 - Safety and Security Films for security films to be applied as shown for secure vestibules and reception areas.

E. Type 2 - Spandrel glazing.
   1. Applications: Exterior spandrel glazing unless otherwise indicated.
   2. Space between lites filled with argon.
   3. Basis of Design - Guardian Glass, LLC: www.guardianglass.com.
   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. Inboard Lite: Fully tempered float glass, 1/4 inch (6.4 mm) thick.
      a. Tint: Clear.
      b. Opacifier: Elastomeric coating, on #4 surface.
      c. Opacifier Color: as selected by Architect from manufacturer's full range.
      d. Basis of Design Coating: OpaciCoat 300.
   6. Total Thickness: 1 inch (25.4 mm).

F. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of another acceptable manufacturer.

G. Substitution Procedures: See Section 01 60 00 - Product Requirements.
   1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

2.05 GLAZING UNITS

A. Type 3 - Monolithic Interior Vision Glazing:
   1. Applications: Interior glazing unless otherwise indicated.
   2. Glass Type: Fully tempered float glass.
   3. Tint: Clear.
   4. Thickness: 1/4 inch (6.4 mm), nominal.
   5. Locations: Interior vision panels, doors and sidelites.
   6. Type 3A: Same as Type 3 except use patterned obscure glass.
      a. Pattern: No. 62

B. Type 4 - Fire-Resistance-Rated Glazing: Type, thickness, and configuration of glazing that contains flame, smoke, and blocks radiant heat, as required to achieve indicated fire-rating period of 60 minutes.
   1. Applications:
      a. Glazing in fire-rated window assembly.
      b. Other locations as indicated on drawings.
   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. Glazing Method: As required for fire rating.
   5. Fire-Rating Period: 60 minutes.

6. Nominal Thickness: 1-1/8 inch.
7. 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 (232 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.
8. Manufacturers:
    a. SAFTIFIRST, a division of O'Keeffe's Inc; SuperLite II-XL 60: www.safti.com/#sle.
    b. Technical Glass Products; Pilkington Pyrostop 60: www.fireglass.com/#sle.
    c. Substitutions: Refer to Section 01 60 00 - Product Requirements.

C. Type 5 - Fire-Protection-Rated Glazing: Type, thickness, and configuration of glazing that contains flame, smoke, and does not block radiant heat, as required to achieve indicated fire-rating period of 45 minutes.
1. Applications:
    a. Glazing in fire-rated door assembly.
    b. Glazing in fire-rated window assembly.
    c. Other locations as indicated on drawings.
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. Glazing Method: As required for fire rating.
5. Fire-Rating Period: 45 minutes.
6. Nominal Thickness: 1 inch.
7. Markings for Fire-Protection-Rated Glazing Assemblies: Provide permanent markings on fire-protection-rated glazing in compliance with ICC (IBC), local building code, and authorities having jurisdiction
    a. "D" - meets fire door assembly criteria of NFPA 252, UL 10B, or UL 10C fire test standards.
    b. "OH" - meets fire window assembly criteria including hose stream test of NFPA 257, or UL 9 fire test standards.
    c. "H" - meets fire door assembly hose stream test of NFPA 252, UL 10B, or UL 10C fire tests standards.
    d. "XXX" - placeholder that represents fire-rating period, in minutes.
8. Products:
    a. Technical Glass Products; Pilkington Pyrostop 45: www.fireglass.com
    b. Safti-First SuperLite II-XL 45: safti.com
    c. Substitutions: See Section 016000.

D. Type 6 - Fire-Resistance-Rated Glazing: Type, thickness, and configuration of glazing that contains flame, smoke, and blocks radiant heat, as required to achieve indicated fire-rating period of 90 minutes.
1. Applications:
    a. Glazing in fire-rated door assembly.
    b. Other locations as indicated on drawings.

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. Glazing Method: As required for fire rating.
5. Fire-Rating Period: 90 minutes.
6. Nominal Thickness: 1-1/2 inch.
7. 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 (232 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.
8. Manufacturers:
   a. SAFTIFIRST, a division of O'Keeffe's Inc; SuperLite II-XL 90: www.safti.com/#sle.
   b. Technical Glass Products; Pilkington Pyrostop 90: www.fireglass.com/#sle.
   c. Substitutions: Refer to Section 01 60 00 - Product Requirements.

E. Type 7 - Monolithic Ballistic Resistant Safety Glazing: Non-fire-rated.
1. Applications:
   a. Interior glazed lites in doors in secure vestibules.
   b. Interior glazed sidelights and vision panels in secure vestibules.
   c. Other locations indicated on drawings.
2. Glass Type: Laminated safety glass as specified.
3. Tint: Clear.
4. Thickness: 1/2 inch, nominal, comprised of two 1/4" thick annealed glass lites with PVB interlayer.
5. Safety and Security Film: See Section 08 87 23 - Safety and Security Films

F. Type 7A - Monolithic Safety Glazing: Non-fire-rated.
1. Applications:
   a. Interior glazed lites in doors in Gymnasium.
   b. Glazed view windows and panels in partitions enclosing athletic activity rooms, except in fire-rated walls and partitions.
   c. Other locations required by applicable federal, state, and local codes and regulations.
   d. Other locations indicated on drawings.
2. Glass Type: Laminated safety safety glass as specified.
3. Tint: Clear.
4. Thickness: 1/4 inch (6.4 mm), nominal, comprised of two 1/8" thick annealed glass lites with PVB interlayer.

2.06 GLAZING COMPOUNDS

A. Butyl Sealant: Single component; ASTM C920 Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.

B. Polysulfide Sealant: Two component; chemical curing, non-sagging type; ASTM C920 Type M, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.

C. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; clear color.

2.07 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. Thickness: As required for application.

D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; color black.

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 immediately 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, etc.

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 - PRESSURE GLAZED SYSTEMS

A. Application - Exterior Glazed: Set glazing infills from exterior side of 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 pressure plates without displacing glazing gasket; exert pressure for full continuous contact.
E. Install cover plate.

3.06 FIELD QUALITY CONTROL

A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
B. Monitor and report installation procedures and unacceptable conditions.

3.07 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
B. Remove non-permanent 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 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.08 PROTECTION

A. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION 08 80 00

SECTION 08 87 23 - SAFETY AND SECURITY FILMS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Glazing film applied to new glazing assemblies.
   1. Provide security film for all glazing in Vestibule V1 and Admin 174.
B. New Glazing: Factory or shop install film to glazing before installation in frames.
C. Glazing assemblies to receive film are indicated on drawings.

1.02 RELATED REQUIREMENTS

A. Section 08 80 00 - Glazing: New glazing to receive film.

1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials,Current Edition.
B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015.
C. ASTM C1184 - Standard Specification for Structural Silicone Sealants 2018, with Editorial Revision.
D. ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting 2018.
E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
F. UL 752 - Standard for Bullet-Resisting Equipment Current Edition, Including All Revisions.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Record of product certification for safety requirements.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods.
C. Samples: For each film product to be used, minimum size 4 inches by 6 inches, representing actual product, color, and patterns.
D. Test Reports: Detailed reports of full-scale chamber tests to specified criteria, using assemblies identical to those required for this project.
E. Specimen Warranty.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Glazing film manufacturer specializing in manufacture of safety glazing films with minimum 10 years successful experience.
B. Installer Qualifications: Certified by glazing film manufacturer.

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 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.

1.08 WARRANTY

A. Provide 10 year manufacturer's replacement warranty to cover film against peeling, cracking, discoloration, and deterioration.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of design: C BOND, www.cbondsystems.com
   1. Ballistic Resistant System shall be system of ballistic rated film products applied to glass surfaces with a nano-technology fluid and edge anchor system to impart safety and security characteristics to meet the UL-752 Level II requirement.
B. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 SAFETY AND SECURITY GLAZING FILM

A. Clear security film with frame attachment.
   1. Provide at glazed entrances, including glazed doors, sidelites, and transoms.
   2. Basis-of-design:
      a. C BOND II Ballistic Resistant Film System

2.03 MATERIALS

A. Accessory Materials: As recommended or required by film manufacturer.
B. Glass Cleaner: As recommended by glazing film manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine glass and frames. Verify that existing conditions are adequate for proper application and performance of film.
B. Verify glass is not cracked, chipped, broken, or damaged.
C. Verify that frames are securely anchored and free of defects.

3.02 PREPARATION

A. Clean glass of dust, dirt, paint, oil, grease, mildew, mold, and other contaminants that would inhibit adhesion.
B. Immediately prior to applying film, thoroughly wash glass with neutral cleaning solution.
C. Protect adjacent surfaces.
D. Do not begin installation until substrates have been properly prepared.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions, without air bubbles, wrinkles, streaks, bands, thin spots, pinholes, or gaps, as required to achieve specified performance.
B. Accurately cut film with straight edges to required sizes allowing 1/16 inch to 1/8 inch gap at perimeter of glazed panel unless otherwise required by anchorage method.
C. Seams: Seam film only as required to accommodate material sizes; form seams vertically without overlaps and gaps; do not install with horizontal seams.

D. Clean glass and anchoring accessories following installation. Remove excess sealants and other glazing materials from adjacent finished surfaces.
E. Remove labels and protective covers.

3.04 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

SECTION 08 91 00
LOUVERS

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Louvers, frames, and accessories.

1.02 RELATED REQUIREMENTS
- A. Section 07 62 00 - Sheet Metal Flashing and Trim.
- B. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.
- C. Section 08 45 23 - Translucent Wall Assemblies : Louvers that are part of translucent wall assemblies.

1.03 REFERENCE STANDARDS
- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2022.
- C. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating 2023.
- D. AMCA 511 - Certified Ratings Program Product Rating Manual for Air Control Devices 2021, with Editorial Revision (2022).

1.04 SUBMITTALS
- A. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.
- B. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, and tolerances; head, jamb and sill details; blade configuration, screens, blank-off areas required, and frames.
- C. Samples: Submit two samples 2 by 2 inches (50 by 50 mm) in size illustrating finish and color of exterior and interior surfaces.
- D. Test Reports: Independent agency reports showing compliance with specified performance criteria.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE
- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.06 WARRANTY
- A. Provide five year manufacturer's warranty against distortion, metal degradation, and connection failures of louver components.
  1. Finish: Include twenty year coverage against degradation of exterior finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS
- A. Louvers:
  1. Airolite Company, LLC; Model SCH501: www.airolite.com.

2. Construction Specialties, Inc; Model RSH-5700: www.c-sgroup.com.
3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 LOUVERS

A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
   1. Wind Load Resistance: Design to resist positive and negative wind load indicated on structural drawings for cladding components without damage or permanent deformation.
   2. Intake Louvers: Design to allow maximum of 0.01 oz/sq ft (3.1 g/sq m) water penetration at calculated intake design velocity based on design air flow and actual free area, when tested in accordance with AMCA 500-L.
B. Stationary Storm-Resistant Louvers: Horizontal blade, extruded aluminum construction, with intermediate mullions matching frame.
   1. Free Area: 43%, minimum.
   2. Blades: Airfoil-shaped.
   3. Frame: 5 inches deep (127 mm deep), channel profile; corner joints mitered and, with continuous recessed caulking channel each side.
      a. For units set in door and window openings, provide 1" glazing pocket frame.
   4. Aluminum Thickness: Frame 12 gauge, 0.0808 inch (2.05 mm) minimum; blades 12 gauge, 0.0808 inch (2.05 mm) minimum.

2.03 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

2.04 FINISHES

A. Superior Performing Organic Coatings System: Manufacturer's standard multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent polyvinylidene fluoride (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).

2.05 ACCESSORIES

A. Blank-Off Panels: Aluminum face and back sheets, polyisocyanurate foam core, 1-1/2 inch (38 mm) thick, painted black on exterior side; provide where duct connected to louver is smaller than louver frame, sealing off louver area outside duct.
B. Bird Screen: Interwoven wire mesh of aluminum, 14 gage, 0.0641 inch (1.63 mm) diameter wire, 1/2 inch (13 mm) open weave, diagonal design.
C. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.
D. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.
B. Verify that field measurements are as indicated.

3.02 INSTALLATION

A. Install louver assembly in accordance with manufacturer's instructions.
B. Install louvers level and plumb.
C. Set sill members and sill flashing in continuous bead of sealant.

D. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
E. Secure louver frames in openings with concealed fasteners.
F. Coordinate with installation of mechanical ductwork.

3.03 CLEANING

A. Strip protective finish coverings.
B. Clean surfaces and components.

END OF SECTION 08 91 00

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SECTION 09 05 61
COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
   1. Resilient tile and sheet.
   2. Broadloom carpet.
   3. Carpet tile.
   4. Thin-set ceramic tile and porcelain tile.
   5. Resinous flooring
   6. Resinous matrix terrazzo flooring.

B. Preparation of new concrete floor slabs for installation of floor coverings.

C. Testing of concrete floor slabs for moisture and alkalinity (pH).

D. Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.
   1. Contractor shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.

E. Patching compound.

F. Remedial floor coatings.

1.02 RELATED REQUIREMENTS

A. Section 01 21 00 - Allowances : Quantity allowances to be included in teh Base Bid.

B. Section 01 22 00 - Unit Prices: Bid pricing for remediation treatments if required.

C. Section 01 40 00 - Quality Requirements: Additional requirements relating to testing agencies and testing.

D. Section 03 30 00 - Cast-in-Place Concrete: Limitations on curing requirements for new concrete floor slabs.

1.03 PRICE AND PAYMENT PROCEDURES

A. Allowances: See Section 01 21 00 - Allowances .

B. Unit Prices: See Section 01 22 00 - Unit Prices.

C. Unit Price for Remedial Floor Coating or Sheet Membrane: Do not include the cost of the floor coating or underlayment in the base bid; state on the bid form the unit price per square foot (square meter) for the floor coating or underlayment, installed, in the event such remediation is required.
   1. Base the unit price on a total quantity of 10,000 square feet (1000 square meters).

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:

1. Moisture and alkalinity (pH) limits and test methods.
2. Manufacturer's required bond/compatibility test procedure.

C. Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation.
1. Manufacturer's qualification statement.
2. Certificate: Manufacturer's certification of compatibility with types of flooring applied over remedial product.
3. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.
4. Manufacturer's installation instructions.
5. Specimen Warranty: Copy of warranty to be issued by coating manufacturer and certificate of underwriter's coverage of warranty.

D. Testing Agency's Report:
1. Description of areas tested; include floor plans and photographs if helpful.
2. Summary of conditions encountered.
3. Moisture and alkalinity (pH) test reports.
4. Copies of specified test methods.
5. Recommendations for remediation of unsatisfactory surfaces.
6. Submit report directly to Owner.
7. Submit report not more than two business days after conclusion of testing.

E. Adhesive Bond and Compatibility Test Report.

1.06 QUALITY ASSURANCE

A. Moisture and alkalinity (pH) testing shall be performed by an independent testing agency employed and paid by Contractor.

B. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project Owner's project contact information.

C. Contractor's Responsibility Relating to Independent Agency Testing:
1. Provide access for and cooperate with testing agency.
2. Confirm date of start of testing at least 10 days prior to actual start.
3. Allow at least 4 business days on site for testing agency activities.
4. Achieve and maintain specified ambient conditions.
5. Notify Architect when specified ambient conditions have been achieved and when testing will start.

D. Remedial Coating Installer Qualifications: Company specializing in performing work of the type specified in this section, trained by or employed by coating manufacturer, and able to provide at least 3 project references showing at least 3 years' experience installing moisture emission coatings.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, handle, and protect products in accordance with manufacturer’s instructions and recommendations.

B. Deliver materials in manufacturer’s packaging; include installation instructions.

C. Keep materials from freezing.

1.08 FIELD CONDITIONS

A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F (18 degrees C) or more than 85 degrees F (30 degrees C).

B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

PART 2 PRODUCTS

2.01 REMEDIAL FLOOR COATING MATERIALS

A. Manufacturer: HPS North America, Inc., a Schönox provider
   515 Wilhite Street
   Florence, AL 35630
   Phone: (256) 246-0345
   Fax: (256) 246-0346
   Email: info@hpsubfloors.com
   Web: www.hpsubfloors.com

B. Primer: Schönox EPA Two-part Epoxy-based Moisture Mitigation System.

C. Self-Leveling Underlayment: Schönox AP Self-leveling Underlayment

D. Substitutions: See Section 01 60 00 - Product Requirements.

E. Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
   1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
   2. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.

PART 3 EXECUTION

3.01 CONCRETE SLAB PREPARATION

A. Perform following operations in the order indicated:
   1. Preliminary cleaning.
   2. Moisture vapor emission tests; 3 tests in the first 1000 square feet (100 square meters) and one test in each additional 1000 square feet (100 square meters), unless otherwise indicated or required by flooring manufacturer.
   3. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
   4. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
   5. Specified remediation, if required.
   6. Patching, smoothing, and leveling, as required.
   7. Other preparation specified.
   8. Adhesive bond and compatibility test.
   9. Protection.

B. Remediations:
   1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
   2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating or remedial sheet membrane over entire suspect floor area.

3. Excessive Alkalinity (pH): If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

3.02 PRELIMINARY CLEANING

A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
B. Do not use solvents or other chemicals for cleaning.

3.03 MOISTURE VAPOR EMISSION TESTING

A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
C. Test in accordance with ASTM F1869 and as follows.
D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.
E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet (1.4 kg per 93 square meters) per 24 hours.
F. Report: Report the information required by the test method.

3.04 INTERNAL RELATIVE HUMIDITY TESTING

A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
C. Test in accordance with ASTM F2170 Procedure A and as follows.
D. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.
E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.
F. Report: Report the information required by the test method.

3.05 ALKALINITY TESTING

A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
B. The following procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
    1. Use a wide range alkalinity (pH) test paper, its associated chart, and distilled or deionized water.
    2. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch (25 mm) in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity (pH) test paper into the water, remove it, and compare immediately to chart to determine alkalinity (pH) reading.

3. Use of a digital pH meter with probe is acceptable; follow meter manufacturer's instructions.

C. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

3.06 PREPARATION

A. See individual floor covering section(s) for additional requirements.
B. Comply with requirements and recommendations of floor covering manufacturer.
C. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
D. Do not fill expansion joints, isolation joints, or other moving joints.

3.07 ADHESIVE BOND AND COMPATIBILITY TESTING

A. Comply with requirements and recommendations of floor covering manufacturer.

3.08 APPLICATION OF REMEDIAL FLOOR COATING

A. Comply with requirements and recommendations of coating manufacturer.

3.09 PROTECTION

A. Cover prepared floors with building paper or other durable covering.

3.10 SCHEDULE

A. Regardless of test results, provide Remedial Floor Coating at all slab-on-grade Basement areas scheduled to receive resilient flooring.
B. Provide Remedial Floor Coating at upper floor areas that do not pass testing. Allowance (to be included in Base Bid) shall be for 5,000 square feet of remediation. Adjustments to allowance will be done using Unit Prices.

END OF SECTION 09 05 61

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SECTION 09 21 16 – GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.
B. Metal stud wall framing.
C. Metal channel ceiling framing.
D. Gypsum sheathing.
E. Cementitious backing board.
F. Gypsum wallboard.
G. Joint treatment and accessories.
H. Bullet resistant sheathing and wallboard.

1.2 RELATED DOCUMENTS

A. Section 05 40 00 - Cold-Formed Metal Framing: Exterior wind-load-bearing metal stud framing.
B. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.
C. Section 07 21 00 - Thermal Insulation: Acoustic insulation.
D. Section 07 84 00 - Firestopping: Top-of-wall assemblies at fire rated walls.
E. Section 07 92 00 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.

1.3 REFERENCE STANDARDS

A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members 2012.
B. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units 1999 (Reaffirmed 2016).
C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
D. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board 2017.
E. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members 2018.
F. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products 2020.
G. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board 2020.
H. 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 2018.
I. 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 2020.
J. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base 2019.

K. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2017.
L. ASTM C1278/C1278M - Standard Specification for Fiber-Reinforced Gypsum Panel 2017.
M. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing 2018.
N. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units 2021.
O. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2017.
P. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels 2019.
Q. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2016.
R. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).
S. ASTM E413 - Classification for Rating Sound Insulation 2016.
T. GA-216 - Application and Finishing of Gypsum Panel Products 2018.
U. GA-226 - Application of Gypsum Board to Form Curved Surfaces; Gypsum Association 2016.
V. UL 752 - Standard for Bullet-Resisting Equipment Current Edition, Including All Revisions.
W. UL (FRD) - Fire Resistance Directory Current Edition.

1.4 SUBMITTALS

A. Product Data: Provide data on metal framing, gypsum board, glass mat faced gypsum board, accessories, and joint finishing system.
B. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
C. Test Reports: For stud framing products that do not comply with ASTM C645 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.
D. Test Reports: Bullet resistant sheathing and wallboard.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum five years of documented experience.

PART 2 - PRODUCTS

2.1 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. Fire Rated Assemblies: Provide completed assemblies with the following characteristics:
   1. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).
      a. Refer to Drawings for UL Assembly Numbers.

2.2 METAL FRAMING MATERIALS

A. Manufacturers - Metal Framing, Connectors, and Accessories:
   1. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com.
   2. Marino: www.marinoware.com.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Non-Loadbearing Framing System Components: ASTM C645; 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/240 at 5 psf.
   1. Steel Sheet Components: Comply with ASTM A1003 requirements for metal unless otherwise indicated.
   2. Protective coating: ASTM A653/A653M G40 hot-dip galvanized unless otherwise noted.
   3. Studs: "C" shaped with flat or formed webswith reinforcing ribs.
      a. Minimum Base-Metal Thickness: 0.019 inches (20 ga equivalent), in addition to the minimum thickness required by performance requirements for horizontal deflection.
      b. Depth: As indicated on Drawings.
   4. Ceiling Channels: C-shaped.
   5. Furring: Hat-shaped sections, minimum depth of 7/8 inch.

C. Loadbearing Studs for Application of Gypsum Board: As specified in Section 05 40 00.

D. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.

E. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing 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 S100-12.
   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-rated head of partition joint systems specified in Section 07 84 00.
   4. Provide mechanical anchorage devices as described above that accommodate deflection while maintaining the fire-rating of the wall assembly.

F. Grid Suspension Systems: Steel grid system of main tees and support bars connected to structure using hanging wire.
   1. Products:
      a. USG Corporation; Drywall Suspension System: www.usg.com/#sle.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

2.3 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
1. CertainTeed Corporation: www.certainteed.com.
2. Georgia-Pacific Gypsum: www.gpgypsum.com.
3. National Gypsum Company: www.nationalgypsum.com/#sle.
4. USG Corporation: www.usg.com.
5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Use for vertical surfaces and ceilings, 8'-0" and higher, unless otherwise indicated. Use for inner layer of multi-layer applications, unless otherwise indicated.
2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
3. Mold resistant board is required at all locations.
4. At All Assemblies: Use type required by indicated tested fire-rated assembly; if no tested fire-rated assembly is indicated, use Type X board, UL or WH listed.
5. Thickness:
   a. Vertical Surfaces: 5/8 inch.
   b. Ceilings: 5/8 inch.
6. Mold Resistant Paper Faced Products:
   a. National Gypsum Company; Gold Bond XP Gypsum Board: www.nationalgypsum.com/#sle.
   b. CertainTeed Corporation; ProRoc Brand Moisture & Mold Resistant Gypsum Board..
   c. Lafarge North America Inc; Mold Defense Drywall..
   d. USG Corporation; Sheetrock Brand Mold Tough Gypsum Panels.
   e. Substitutions: See Section 01 60 00 - Product Requirements.

C. Abuse Resistant Wallboard:
1. Application: All locations, 8'-0" and below, except Gymnasium and cafeteria
2. Surface Abrasion: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
3. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
4. Soft Body Impact: Level 2, minimum, when tested in accordance with ASTM C1629/C1629M.
5. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
6. Paper-Faced Type: Gypsum wallboard as defined in ASTM C1396/C1396M.
7. Unfaced Type: Interior fiber-reinforced gypsum panels as defined in ASTM C1278/C1278M.
8. Type: Fire resistance rated Type X, UL or WH listed.
9. Thickness: 5/8 inch.
10. Edges: Tapered.
11. Paper-Faced Products:
    a. CertainTeed Corporation; Extreme Abuse Resistant Drywall with M2Tech: www.certainteed.com/#sle.
    b. National Gypsum Company; Gold Bond Hi-Abuse XP Gypsum Board: www.nationalgypsum.com/#sle.
    c. USG; Fiberock Aqua-Tough Interior Panel.
    d. Substitutions: See Section 01 60 00 - Product Requirements.

D. Impact Resistant Wallboard:
   1. Application: Gypsum board partitions in Gymnasium and Cafeteria.
   2. Surface Abrasion: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
   3. Indentation: Level 1, minimum, when tested in accordance with ASTM C1629/C1629M.
   4. Soft Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
   5. Hard Body Impact: Level 3, minimum, when tested in accordance with ASTM C1629/C1629M.
   6. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   7. Paper-Faced Type: Gypsum wallboard as defined in ASTM C1396/C1396M.
   8. Unfaced Type: Interior fiber-reinforced gypsum panels as defined in ASTM C1278/C1278M.
   9. Type: Fire resistance rated Type X, UL or WH listed.
   10. Thickness: 5/8 inch.
   11. Edges: Tapered.
   12. Paper-Faced Products:
      a. CertainTeed Corporation; Extreme Impact Resistant Drywall with M2Tech: www.certainteed.com/#sle.
      b. National Gypsum Company; Gold Bond Hi-Impact XP Gypsum Board: www.nationalgypsum.com/#sle.
      c. USG Sheetrock Brand Mold Tough VHI Firecode X Panels.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

E. Backing Board for Wet Areas:
   1. Application: Surfaces behind tile in wet areas including shower room tile installations.
   2. Application: Exterior soffits where textured acrylic finish systems are indicated.
   3. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
      a. Thickness: 1/2 inch.
      b. Products:
         1) Custom Building Products; Wonderboard: www.custombuildingproducts.com.
         2) National Gypsum Company; PermaBase Cement Board: www.nationalgypsum.com/#sle.
         3) USG Corporation; Durock Brand Cement Board: www.usg.com.
         4) Substitutions: See Section 01 60 00 - Product Requirements.

F. Backing Board for Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
   1. Application: Vertical surfaces behind thinset tile, except in wet areas.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   3. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
   4. Type: Type X, in locations indicated.
   5. Type X Thickness: 5/8 inch.
   6. Edges: Tapered.
   7. Products:
      a. National Gypsum Company; Gold Bond Hi-Abuse XP Gypsum Board.
      b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer..

c. USG; Fiberock Aqua-Tough Interior Panel..
d. Substitutions: See Section 01 60 00 - Product Requirements.

G. Bullet Resistant Sheathing and Wallboard: Woven roving, multi-ply, ballistic grade fiberglass cloth with thermoset polyester resin; comply with UL 752 Level 2.
1. Thickness: 5/16 inch.
2. Products:
a. ArmorCore by Waco Composites; Bullet Resistant Fiberglass Panels: www.armorcore.com/#sle.
b. Substitutions: See Section 01 60 00 - Product Requirements.
3. Location: Provide for all interior walls of Vestibule V1 and Admin. 174.

H. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
1. Application: Exterior sheathing, unless otherwise indicated.
2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
3. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
4. Core Type: Type X, as indicated.
5. Type X Thickness: 5/8 inch.
6. Edges: Square.
7. Glass Mat Faced Products:
a. CertainTeed Corporation; GlasRoc Type X Exterior Sheathing: www.certainteed.com/#sle.
b. Georgia-Pacific Gypsum; DensGlass Sheathing: www.gpgypsum.com/#sle.
c. National Gypsum Company; Gold Bond eXP Sheathing: www.nationalgypsum.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

I. GYP-2 Acoustical Drywall Panels: Basis of Design: USG Interiors, LLC, “USG ENSEMBLE® ACOUSTICAL DRYWALL SYSTEM”
1. acceptable products by other manufacturers are:
a. Armstrong ACOUSTIBuilt panels #2604
b. Rockfon Mono Acoustics
c. Pyrok StarSilent
2. 5/8” Perforated non-fire rated gypsum panel with acoustically transparent scrim
a. 4’ wide tapered edges all 4 sides
3. Acoustic Backer Panel
a. NRC: Not less than 0.80.
b. CAC: Not less than 40.
c. Edge/Joint Detail: SQ Square.
d. Panel Thickness: 1 inch
e. Modular Size: 23.5 by 48 inches
f. VOC Emissions: Meets CA Specification 01350, CHPS listed for low emitting materials

J. Finishing
1. Joint Tape
a. Interior: precreased paper
b. Glass-Mat sheathing: 10X10 glass mesh
c. Tile Backing: as recommended by panel Manufacturer.
2. Joint Compound for interior applications

a. Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats
b. Prefilling: At open joints**,** rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound
c. Prefilling: At open joints**,** rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound
d. Use setting-type compound for installing paper-faced metal trim accessories
e. Fill Coat: For second coat, use drying-type, all-purpose compound
f. Finish Coat: For third coat, use drying-type, all-purpose compound
g. Skim Coat: For final coat of Level 5 finish, use high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish

3. Joint Compound for Exterior Applications
   a. Exterior Gypsum Soffit Board: Use setting-type taping compound and setting-type, sandable topping compound
   b. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer
4. Joint Compound for Tile Backing Panels
   a. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer
   b. Cementitious Backer Units: As recommended by backer unit manufacturer
   c. Water-Resistant Gypsum Backing Board: Use setting-type taping compound and setting-type, sandable topping compound

2.4 ACCESSORIES

A. Acoustic Insulation: As specified in Section 07 21 00.

B. Acoustic Sealant: As specified in Section 07 92 00; Type 5.

C. Finishing Accessories: ASTM C1047, paper-faced galvanized steel, unless noted otherwise.
   1. Types: As detailed or required for finished appearance.

D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
   1. Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
   2. Chemical hardening type compound.

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.
   1. Products:
      a. CertainTeed Corporation; Level V Wall and Ceiling Primer/Surfacer with M2Tech: www.certainteed.com/#sle.
      b. USG Sheetrock Brand Tuff-Hide Primer-Surfacer.
      c. Substitutions: See Section 01 60 00 - Product Requirements.

F. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch 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 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.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.2 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Suspended Ceilings and Soffits: Space framing and furring members at 16 inches on center.
1. Level ceiling system to a tolerance of 1/120.
2. Laterally brace entire suspension system.

C. Studs: Space studs as required by performance requirements for horizontal deflection, 16 inches on center maximum.
1. Extend partition framing to underside of structure as indicated.
2. 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.

D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

E. Standard Wall Furring: Install at concrete and masonry walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
1. Orientation: Horizontal.
2. Spacing: At 16 inches on center.

F. 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, including wall stops.
7. Handrails and wall brackets.
8. Display cases, markerboards, tack boards.
9. TV and monitor mounts.

3.3 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.

B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
   a. Place two beads continuously on substrate before installation of perimeter framing members.
   b. Place continuous bead at perimeter of each layer of gypsum board.
   c. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

3.4 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 Non-Rated: Install gypsum board parallel to framing, with ends and edges occurring over firm bearing.

C. Double-Layer Non-Rated: Use gypsum board for first layer, placed perpendicular to framing or furring members, with ends and edges occurring over firm bearing. Place second layer parallel to framing or furring members. Offset joints of second layer from joints of first layer.

D. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

E. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
   1. Seal joints, cut edges, and holes with water-resistant sealant.

F. Exterior Soffits: Install cementitious backing boards perpendicular to framing, with staggered end joints over framing members or other solid backing.
   1. Seal joints, cut edges, and holes with water resistant sealant.

G. Cementitious Backing Board: Install over steel framing members where indicated, in accordance with ANSI A108/A118/A136.1 and manufacturer's instructions.

H. Installation on Metal Framing: Use screws for attachment of gypsum board.

I. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

J. Bullet Resistant Sheathing and Wallboard:
   1. Install bullet-resistant sheathing according to manufacturer's written recommendations and with manufacturer-approved fasteners.
   2. Cover all joints between boards with a 4 inch strip of the same thickness material as the boards, centered on the joint.

3.5 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 apart on walls and ceilings over 50 feet long.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

D. Exterior Soffit Vents: Install according to manufacturer's written instructions and in locations indicated on the drawings. Provide vent area specified.

3.6 JOINT TREATMENT

A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, bedded and finished with chemical hardening type joint compound.

B. Paper Faced Gypsum Board: Use paper or fiberglass joint tape, bedded with chemical hardening type joint compound and finished with chemical hardening type joint compound.

C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 5: not required.
   2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
   4. Level 1: Fire 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.
   2. Taping, filling and sanding is not required at base layer of double layer applications.

3.7 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 30 00
TILING

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Tile for wall applications.
- B. Mortar bed for sloped shower applications.
- C. Non-ceramic trim.

1.02 RELATED REQUIREMENTS
- A. Section 07 92 00 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.
- B. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.
- C. Section 09 21 16 - Gypsum Board Assemblies: Tile backer board.
- D. Section 09 66 16 - Precast Terrazzo Treads and Landings
- E. Section 09 67 00 - Resinous Floor Finish in shower areas.

1.03 REFERENCE STANDARDS
- A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium) 2019.
  1. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar 2017 (Reaffirmed 2022).
  2. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar 2017.
  3. ANSI A108.1c - Contractor's Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar 1999 (Reaffirmed 2021).
  4. ANSI A108.2 - American National Standard General Requirements: Materials, Environmental and Workmanship 2019.
  5. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesive or Water Cleanable Tile-Setting Epoxy Adhesive 2019.
  6. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar 2021.
  7. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grout Epoxy 1999 (Reaffirmed 2019).
  8. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout 1999 (Reaffirmed 2019).
  9. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout 1999 (Reaffirmed 2019).
  10. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework 2017 (Reaffirmed 2022).
  11. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units 2018.
  12. ANSI A108/A118/A136.1 - Specifications for the Installation of Ceramic Tile 2020.
  13. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar 1999 (Reaffirmed 2019).

14. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone 2005 (Reaffirmed 2021).
15. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar 2020.
16. ANSI A108.20 - American National Standard Specifications for Exterior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs 2020.
17. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation 2019.
18. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone 2014 (Reaffirmed 2019).

B. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation 2014 (Reaffirmed 2019).
C. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar 2019.
    1. ANSI A137.1 - American National Standard Specifications for Ceramic Tile 2022.
    2. 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).
D. ASTM C 1028 - Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method; 2006.
E. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation 2023.

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 01 30 00 - 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, ceramic accessories, and setting details.
D. Samples: Provide two (2) full size samples of each floor and wall tile type, and 12 inch long sample of each non-ceramic trim.
E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
F. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.
G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
    1. See Section 01 60 00 - Product Requirements, for additional provisions.
    2. Extra Tile: 1 percent of each size, color, and surface finish combination.

1.06 QUALITY ASSURANCE

A. Maintain one copy of ANSI A108/A118/A136 and TCNA (HB) on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.
C. Installer Qualifications:
1. Company specializing in performing tile installation, with minimum of five years of documented experience.

1.07 MOCK-UPS
A. See Section 01 40 00 - Quality Requirements for general requirements for mock-up.
B. Construct tile mock-up where indicated on drawings, incorporating all components specified for the location.
1. Mock-up size: 20 square feet, minimum.
2. Provide mock-up for each type of tile application and pattern.
3. Approved mock-up may remain as part of work.

1.08 DELIVERY, STORAGE, AND HANDLING
A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.09 FIELD CONDITIONS
A. 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 TILE
A. Glazed Wall Tile, Type CWT-1, CWT-2, CWT-3, CWT-4, CWT-5, CWT-6: ANSI A137.1 standard grade.
1. Moisture Absorption: 7.0 to 20.0 percent as tested in accordance with ASTM C373.
2. Size (typical): 8 by 24 inch (203 by 609 mm inch), nominal.
3. Size (typical): 8 by 24 inch (203 by 609 mm)
4. Size (CWT-6): 4 by 12 inch (109 by 328 mm), nominal, bullnose on 12 inch side.
5. Thickness: 3/8 inch (9.30 mm)
6. Edges: Cushioned.
7. Surface Finish: semi-gloss.
8. Trim Units: Matching bullnose and cove shapes in sizes coordinated with field tile.
9. Products:
a. Dal-Tile Corporation; Color Wheel Collection - Linear: www.daltile.com/#sle.
b. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 TRIM AND ACCESSORIES
A. Porcelain Trim: Matching bullnose ceramic shapes in sizes coordinated with field tile.
1. Applications:
a. Open Top Edges: Bullnose.
b. Inside Corners: Jointed.
2. Manufacturers: Same as for tile.
B. Trim: Brushed stainless steel, style and dimensions to suit application to suit application, for setting using tile mortar or adhesive.
1. Applications:
a. Open edges of wall tile.
b. Wall corners, outside..
2. Manufacturers:
a. Schluter-Systems: www.schluter.com/#sle.
1) Rondec, brushed stainless steel.

2) Provide finish cap and end trim
b. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 SETTING MATERIALS

A. Provide setting and grout materials from same manufacturer.
B. Improved Latex-Portland Cement Mortar Bond Coat: ANSI A118.15.
1. Applications: Use this type of bond coat where indicated, and where no other type of bond coat is indicated.
2. Products:
a. Custom Building Products; Complete Contact-LFT Premium Rapid Setting Large Format Tile Mortar, with Multi-Surface Bonding Primer: www.custombuildingproducts.com/#sle.
b. LATICRETE International, Inc; LATICRETE 254 Platinum: www.laticrete.com/#sle.
c. Substitutions: See Section 01 60 00 - Product Requirements.
C. Mortar Bed Materials: Pre-packaged mix of Portland cement, sand, latex additive, and water.
1. Products:
a. ARDEX Engineered Cements; A 38: www.ardexamericas.com/#sle.
b. LATICRETE International, Inc; LATICRETE 3701 Fortified Mortar Bed: www.laticrete.com/#sle.
c. Custom Building Products; Thick Bed Bedding Mortar: www.custombuildingproducts.com/#sle..
d. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 GROUTS

A. Provide setting and grout materials from same manufacturer.
B. High Performance Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
2. Use sanded grout for joints 1/8 inch (3.2 mm) wide and larger; use unsanded grout for joints less than 1/8 inch (3.2 mm) wide.
3. Color(s): As selected by Architect from manufacturer's full line.
4. Products:
a. ARDEX Engineered Cements; ARDEX FG-C MICROTEC: www.ardexamericas.com/#sle.
b. Custom Building Products; Prism Color Consistent Grout: www.custombuildingproducts.com/#sle.
c. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout: www.laticrete.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 MAINTENANCE MATERIALS

A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.
1. Color(s): As selected by Architect from manufacturer's full line.
2. Products:
a. ARDEX Engineered Cements; ARDEX SX: www.ardexamericas.com/#sle.
b. Custom Building Products; Commercial 100% Silicone Caulk: www.custombuildingproducts.com/#sle.
c. LATICRETE International, Inc; LATICRETE LATASIL: www.laticrete.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.

B. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
   1. Composition: Water-based colorless silicone.

2.06 ACCESSORY MATERIALS

A. Waterproofing Membrane At Floors and Walls: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
   1. Crack Resistance: No failure at 1/16 inch (1.6 mm) gap, minimum; comply with ANSI A118.12.
   2. Fluid or Trowel Applied Type:
      a. Material: Acrylic or Elastomeric.
      b. Thickness: 38 mils (0.96 mm), minimum, dry film thickness.
      c. Products:
         1) ARDEX Engineered Cements; ARDEX 8+9: www.ardexamericas.com/#sle.
         2) Custom Building Products; RedGard Crack Prevention and Waterproofing Membrane: www.custombuildingproducts.com/#sle.
         3) MAPEI, "AquaDefense".
         4) Substitutions: See Section 01 60 00 - Product Requirements.

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 tile.
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 tile.
C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.
D. Cementitious Subfloor Surfaces: Verify that substrates are ready for tiling installation by testing for moisture and alkalinity (pH).
   1. Test in accordance with Section 09 05 61.
   2. Obtain instructions if test results are not within limits recommended by tiling material manufacturer and setting material manufacturer.
   3. Follow moisture and alkalinity remediation procedures in Section 09 05 61.
E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Protect surrounding work from damage.
B. Vacuum clean surfaces and damp clean.
C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
D. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.
E. 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 A108.1a through ANSI A108.20, manufacturer's instructions, and TCNA (HB) recommendations.
B. Lay tile to pattern indicated. 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. Install non-ceramic trim in accordance with manufacturer's instructions.
G. Install thresholds where indicated.
H. Sound tile after setting. Replace hollow sounding units.
I. Keep control and expansion joints free of mortar, grout, and adhesive.
J. Keep expansion joints free of adhesive or grout. Apply sealant to joints.
K. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
L. Grout tile joints unless otherwise indicated.
M. 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.
N. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

3.04 INSTALLATION - FLOORS - MORTAR BED METHODS

A. Locations: Shower areas sloped to drain.
B. Over interior concrete substrates, install in accordance with TCNA (HB) Method F112, bonded.
   1. Use improved latex Portland Cement Mortar bond coat.
C. Waterproofing materials: See Section 09 67 00 .
D. Minimum Mortar Bed Thickness: 5/8 inch (15 mm), unless otherwise indicated. Slope mortar bed to drains as indicated.
E. Resinous floor finish: See Section 09 67 00 .

3.05 INSTALLATION - WALL TILE

A. Over cementitious backer units on studs, install in accordance with TCNA (HB) Method W244, using membrane at shower areas and bottom 18 inches of toilet room walls.
   1. Use improved latex Portland Cement Mortar bond coat.
B. Over interior concrete and masonry install in accordance with TCNA (HB) Method W202, thin-set with dry-set or latex-Portland cement bond coat, using membrane at shower areas.
   1. Use improved latex Portland Cement Mortar bond coat.

3.06 GROUTING

A. Follow grout manufacturer's recommendations as to grouting procedures and precautions.
B. Remove all grout haze, observing both tile and group manufacturer's recommendations as to use of acid and chemical cleaners.
C. Rinse tile work thoroughly with clean water before and after chemical cleaners.
D. Polish surface of tile work with soft cloth.
E. Seal finished grout lines with sealer, applied following directions by the manufacturer.

3.07 CLEANING

A. Clean tile and grout surfaces.

3.08 PROTECTION

A. Apply a protective coat of neutral cleaner solution, 1 part cleaner to 1 part water, or as specified by manufacturer's instructions, to completed tile floors.
B. Cover all tile floors with heavy-duty, non-staining construction paper, taped in place.
C. Prior to final acceptance of tile work, remove paper and rinse protective coat of neutral cleaner from all tile surfaces.

D. Do not permit traffic over finished floor surface for 7 days after installation.

END OF SECTION 09 30 00

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SECTION 09 51 00 - ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.
B. Acoustical units.
C. **Acoustical diffuser panels.**
D. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 07 92 00 - Joint Sealants: Acoustical sealant.
B. Section 09 54 20 - Specialty Ceiling Systems: Specialty ceilings and grids.
C. Section 21 13 00 - Fire-Suppression Sprinkler Systems: Sprinkler heads in ceiling system.
D. Section 23 37 00 - Air Outlets and Inlets: Air diffusion devices in ceiling.
E. Section 26 51 00 - Interior Lighting: Light fixtures in ceiling system.
F. Section 27 51 16 - Public Address Systems: Speakers in ceiling system.
G. Section 28 46 00 - Fire Detection and Alarm: Fire alarm components in ceiling system.

1.03 REFERENCE STANDARDS

A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings 2013a.
B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels 2013.
C. 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 2014.
D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products 2019.

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 the interior wet work is dry.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on suspension system components, acoustical units, and other related components.
C. Samples: Submit two samples 12 x 12 inch (305 x 305 mm) or of size illustrating material and finish of acoustical units.
D. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and related work.
E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
    1. See Section 01 60 00 - Product Requirements, for additional provisions.
    2. Extra Acoustical Units: 100 sq ft of each type and size.

1.06 QUALITY ASSURANCE

A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with a minimum of three years documented experience.

B. 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, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.08 PROJECT CONDITIONS

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. Install acoustical units after interior wet work is dry.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acoustic Tiles/Panels:
   1. Armstrong World Industries, Inc: www.armstrong.com.
   2. CertainTeed Corporation: www.certainteed.com.
   3. USG: www.usg.com.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Suspension Systems:
   1. Same as for acoustical units.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ACOUSTICAL UNITS

A. Acoustical Units - General: ASTM E1264, Class A.

B. Acoustical Panels Type 1 (ACP-1): Painted mineral fiber, ASTM E1264 Type III, with the following characteristics:
   1. Size: 24 by 24 inches.
   2. Thickness: 3/4 inches.
   3. Composition: Wet formed.
   4. NRC Range: .70 .75, determined as specified in ASTM E 1264.
   5. Ceiling Attenuation Class (CAC): 35, determined as specified in ASTM E1264.
   6. Edge: Square.
   7. Surface Color: White.
   8. Suspension System: Exposed grid Type 1.
   9. Products:
      a. USG - Radar ClimaPlus High NRC/CAC Item No. 22521.
      b. Armstrong Fine Fissured School Zone 1713.
      c. Fine Fissured High NRC, No. HHF-457 HNRCX
      d. Substitutions: See Section 01 60 00 - Product Requirements.
   10. Location: classrooms and as noted on drawings.

C. Glass Fiber Acoustical Panels Type 2 (ACP-2): Painted mineral fiber, ASTM E 1264 Type 1 ASTM E1264 Type XII, with the following characteristics:
   1. Size: 24 by 24 inches.
   2. Thickness: 7/8 inches.
   3. Composition: Wet formed.
   4. NRC Range: .80 to .85, determined as specified in ASTM E1264.
   5. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.

6. Edge: Beveled Tegular.
7. Surface Color: White.
8. Surface Pattern: fine texture.
9. Product:
    a. Armstrong: Health Zone Ultima High NRC, Item No 1447
    b. USG: Mars ClimaPlus Healthcare, Item No. 86152
    c. Certainteed: Approved Equal
10. Suspension System: Exposed grid Type 1.
11. Location: Common Corridors, Offices, Reception areas and as noted on drawings

D. Vinyl-laminated face with sealed back and edges for use in cleanroom environments up to Class 100/ISO 5 Acoustical Panels Type 3 (ACP-3): ASTM E 1264 Type 1ASTM E1264 Type XII, with the following characteristics:
1. Size: 24 by 24 inches.
2. Thickness: 1/2 inches.
3. Composition: Wet formed.
4. NRC Range: .80 to .85, determined as specified in ASTM E1264.
5. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
6. Edge: Square.
7. Surface Color: White.
8. Surface Pattern: smooth textured vinyl.
9. Product:
    a. Armstrong: Kitchen Zone, Item No 673
    b. USG: Sheetrock Brand Clean Room Lay-in Ceiling Panel, Item No 3270
    c. Certainteed: Approved Equal
10. Suspension System: Exposed grid Type 2.
11. Location: Kitchen, Culinary Art Lab, and as noted.

2.03 SUSPENSION SYSTEM(S) AND PERIMETER TRIM

A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

B. Exposed Steel Suspension System Type 1: Formed galvanized steel, commercial quality cold rolled; intermediate-duty.
1. Profile: Tee; 15/16 inch wide face.
2. Construction: Double web.
3. Finish: White painted.
4. Products:
    a. DX by USG
    b. Prelude XL; Armstrong
    c. EZ Stab Classic; Certainteed

C. Exposed Steel Suspension System Type 2: Where this designation is indicated, provide acoustical panel ceiling suspension system complying with the following:
1. Products:
    a. ZXLA; USG
    b. Prelude Plus; Armstrong
    c. EZ Stab Classic Environmental Aluminum Capped; Certainteed
2. Wide-Face, Capped, Double-Web, Hot-Dip Galvanized-Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet hot-dip galvanized according to

ASTM A 653/A 653M, G60 (Z180) coating designation, with pre-finished, 15/16-inch-(24-mm-) wide, aluminum caps on flanges; other characteristics as follows:
a. Aluminum Cap Finish: Painted white.

2.04 **ACOUSTICAL DIFFUSER PANELS**

A. **Basis of Design: Provide "Sound Seal Sound Quality FRP Pyramid Diffuser" or approved equal.**
B. **Acoustical Diffuser Panels shall be (0.125") thick fiber reinforced plastic. Finish material to be Lemon Peel texture, white gel-coat finish or wrapped with panel manufacturers standard full line of fabric (to be selected by architect).**
C. **Panel Thickness: nominal (.125) thick**
D. **Panel Size: 24" x 24**
E. **Noise Reduction Coefficient: NRC 0.15 or 0.05**
F. **Back-Mounting Accessories: Manufacturers standard accessories for securely mounting panels, of type and size indicated and complying with the following requirements:**
   1. **Integral ceiling grid lay-in flange.**

[Following paragraph renumbered.]

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-gage 0.08 inch galvanized steel wire.
C. Hangars for "Cloud" Appplications including Perimeter Trim: Aircraft Cable.
D. Hold-Down Clips: Manufacturer's standard clips to suit application.
E. Perimeter Moldings: Same material and finish as grid.
   1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
F. Acoustical Insulation: Specified in Section 07 21 00.
G. Acoustical Sealant For Perimeter Moldings: Non-hardening, non-skinning, for use in conjunction with suspended ceiling system.
   1. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C 834 and the following requirements:
      a. Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
   2. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
      a. Acoustical Sealant for Exposed and Concealed Joints:
         1) PL Acoustical Sealant; Chemrex, Inc., Contech Brands.
         2) AC-20 FTR Acoustical and Insulation Sealant; Pecora Corp.
         3) SHEETROCK Acoustical Sealant; United States Gypsum Co.
H. Touch-up Paint: Type and color to match acoustical and grid units.
I. Fiberglass Edge Sealant: For re-sealing cut fiberglass edges.
J. Stabilizer bars: for plank acoustical tile installations.

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 and ASTM E580/E580M and as supplemented in this section.
B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
C. Locate system on room axis according to reflected ceiling plans.
D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
E. 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. 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.
G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
I. Do not eccentrically load system or induce rotation of runners.
J. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
    1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
    2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m). Miter corners accurately and connect securely.
    3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
K. Form expansion joints .. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.
L. Suspend ceiling hangers from building's structural members and as follows:
    1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
    2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, counter splaying, or other equally effective means.
    3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and

hangers to support ceiling loads within performance limits established by referenced standards and publications.

4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, powder-actuated fasteners, or drilled-in anchors that extend through forms into concrete.
6. Do not attach hangers to steel deck tabs.
7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
8. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches (200 mm) from ends of each member.

M. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

N. Install special brake-metal shapes at window heads so that they are square and finished to provide a precise fit. Do not use exposed fasteners.

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. Lay directional patterned units with pattern parallel to longest room axis.

D. Fit border trim neatly against abutting surfaces.

E. Install units after above-ceiling work is complete.

F. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

G. Cutting Acoustical Units:

1. Cut to fit irregular grid and perimeter edge trim.
2. Make field cut edges of same profile as factory edges.
3. Double cut and field paint exposed reveal edges.

H. Where round obstructions, other similar conditions, bullnose concrete block corners, and other similar conditions occur, provide preformed closures to match perimeter molding.

I. Install hold-down clips on panels within 20 ft of an exterior door, and the following locations:

1. Large Group Toilet Rooms

3.05 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09 54 20 - SPECIALTY CEILING SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Acoustical Sound Diffusing / Reflecting Ceiling Tiles
2. Suspension assemblies
3. Accessories; provide other necessary items including devices for attachment overhead construction, secondary members, splines, splices, connecting clips, wall connectors, wall angles, and other devices required for a complete installation.
4. Coordinate layout and installation of items penetrating or being installed in ceiling systems with responsible trades.

B. Related Sections:
1. Section 05 40 00 - Cold-Formed metal Framing
2. Sections 09 21 16 - Gypsum Board Assemblies
3. Sections 09 51 00 - Acoustical Ceilings
4. Sections 09 90 00 - Paintings and Coatings
5. Division 23 - Heating, Ventilating and Air Conditioning
6. Division 26 - Electrical

C. This Section covers the general requirements only for Specialty Ceiling Systems as shown on the drawings. The supplying and installation of additional accessory feature and other items not specifically mentioned herein, but which are necessary to make a complete installation shall also be included or clarified accordingly.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM)
1. E 84 - “Standard Test Method for Surface Burning Characteristics of Building Materials”
2. E 488 - “Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements”
3. B 209 - “Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate”
4. C 423 - “Sound Absorption and Sound Absorption Coefficients by Reverberation Room Method”
5. E 580 - “Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Moderate Seismic Restraint”
6. C 635 - “Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings”
7. C 636 - “Recommended Practice for Installation of Metal Ceiling Suspensions Systems for Acoustical and Lay-in Panels”
8. A 641 - “Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire”
9. A 653 - “Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip process.
10. E 1264 - Classification for Acoustical Ceiling Products”
11. E 1477 - Standard Test Method for Luminous Reflectance factor of Acoustical Materials by use of Integrating-Sphere Reflectometers”

12. D 1044 - Practice for Abrasion Resistance
13. D 1002 - Practice for Adhesion Resistance

B. Local Building Code: IBC, current edition requirements

1.03 SUBMITTALS

A. Product Data: Manufacturers product data for each type of product specified in this section.

B. Product Certification: Manufacturer's certifications that products comply with specified requirements and governing codes including product data, laboratory test reports and research reports showing compliance with specified standards.

C. Shop Drawings: Submit shop drawings for reflected ceiling plans (RCP's), drawn to scale, and coordinating penetrations and ceiling mounted items. Show the following details:
   1. Reflected ceiling plan including joint patterns & details.
   2. Metal ceiling suspension system plan with appropriate components, suggested hanger locations & details.
   3. Method of attaching suspension system hangers to building structure.
   4. Ceiling-mounted items including: light fixtures, air outlets and inlets, speakers, sprinklers, and other interfaces.
   5. Special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.
   6. Framing and support details for work supported by ceiling suspension system.
   7. List of materials, dimensions, hanger fastenings and any special details.
   8. Minimum drawing scale: 1/8" = 1'-0".
   9. Provide full scale drawings of perforation patterns. Provide minimum 1"=1'-0" scale layout for each panel type showing perforation layout and orientation as required.
   10. Samples for Verification: Full-size units (or as specified below) of each type of ceiling assembly indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics. Submit samples for each type specified.
      a. 12-inch square, (acoustical) metal pan units.
      b. 12-inch long samples of each exposed molding or trim.
      c. 12-inch long samples of each suspension component.

D. Qualification Data: For firms and persons specified in "Quality Assurance". Provide documents to demonstrate their capabilities and experience. Include lists of at least 5 completed projects with project names and addresses, names and addresses of Architects and employers, and other information specified.

1.04 QUALITY ASSURANCE

A. Installer
   1. To certify a minimum 5 years experience installing similar systems and scope to those specified.
   2. Provide list of at least 5 successful installations with similar products and scope. Include names and contact numbers of Architect and employer for reference.

B. Manufacturer
   1. To certify a minimum of 5 years experience manufacturing similar products to those specified.
   2. Provide support documentation including name and date of project completion. Include names and contact numbers of Architect and employers for reference.

3. Manufacturer shall be single source and shall be the fabricator and supplier of appropriate major components.

C. Fire-Test-Response Characteristics: Provide acoustical metal pan ceilings that comply with one of the following requirements:
   1. Fire-response tests performed by UL, ITS/Warnock Hersey, or another independent testing and inspecting agency that is acceptable to authorities having jurisdiction and that performs testing and follow-up services.
   2. Surface-burning characteristics of acoustical metal pan ceilings comply with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84.

D. Pre-installation Conference: Conduct conference at Project site as directed by the project Architect.

E. Mock-Ups: Construct mock-ups for each form of construction and finish required to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mock-up to comply with the following minimum requirements, using materials indicated for completed work:
   1. Locate mock-ups in the location and of the size indicated or, if not indicated, as directed by the Architect. Minimum mock-up size to be 6'x 6' unless otherwise specified.
   2. Notify Architect seven days in advance of the dates and times when mock-ups will be constructed.
   3. Demonstrate the proposed range of aesthetic effects and workmanship.
   4. Site Coordination Mock-up:
      a. For approval of assembly, sequence of installation, coordination of trades involved, including ceiling panel types and shapes.
      b. Sized large enough to include a minimum of 2 adjacent panels Demonstrating interface work of fire protection sprinklers, lighting, mechanical diffusers, anchoring method at steel structure; adjacent vertical wall; skylight and fascia, trim and accessories.
   5. Obtain Architect's approval of mock-ups before starting construction of acoustical metal pan ceilings.
   6. Maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed work.
      a. When directed, demolish and remove mock-ups from project site
      b. Approved mock-ups in an undisturbed condition at the time of initial Acceptance may become part of the completed work, subject to Architect / Owner approval.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical metal ceiling units and suspension system components in original, unopened packages clearly labeled with the following information: name of manufacturing source and location; product type, description and quantity; clients name and shipping address.

B. Panel's protective layer to be removed only after installation is complete to help prevent panel surface damage.

C. Store components in a fully enclosed space where they will be protected against physical damage from direct moisture, significant change in humidity, direct sunlight, significant change in temperature, surface contamination, and any other preventable cause.

D. Exercise care in handling components to prevent damage to the surfaces and edges and prevent distortion or other physical damage. Comply with prescribed stacking instructions to prevent damage to components

1.06 PROJECT CONDITIONS

A. Environmental Limitations
   1. Do not install specialty ceiling systems until after spaces are enclosed and weather tight and after wet work and work above ceilings is complete and accepted by project Architect.
   2. 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. Allow materials to reach ambient temperature and humidity for a minimum of 48 hours prior to starting installation.
   3. Coordinate with other work supported by, adjacent to or penetrating through the ceiling system.

B. Do not install products in exterior space unless the system has been specifically designed and approved for exterior application.

1.07 WARRANTY

A. Provide specified manufacturers warranty against defects in workmanship, discoloration, or other defect considered undesirable by the Architect or Owner.

B. This warranty shall remain in effect for a minimum period of five (5) years from date of initial acceptance.

1.08 MAINTENANCE & EXTRA MATERIALS

A. Maintenance Instructions: Provide manufacturers standard maintenance and cleaning instructions for finishes provided.

B. Extra Materials: Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents. Only typical system components are included with attic stock.
   1. Acoustical Metal Ceiling Pan Units: Full-size units equal to 1½ percent of amount installed.
   2. Ceiling Suspension System Components: Quantity of each grid and exposed component equal to 1½ percent of amount installed.

PART 2 - PRODUCTS

1. SPECIALTY CEILING SYSTEM SPC -1, EXPANDED MESH CEILING PANEL:
   a. Surface Texture: Smooth
   b. Composition: Metal
   c. Color: Nickel Chrome
   d. Size: 24" x 24"
   e. Edge Profile: Square Tegular 15/16" for interface with PRELUDE XL 15/16" Exposed Tee grid.
   f. Perforation Option: Open Mesh
   g. Open Area 70%
   g. Noise Reduction Coefficient (NRC):
   h. Ceiling Attenuation Class (CAC):
   i. Sabin: N/A
   j. Articulation Class (AC):
   k. Flame Spread: ASTM E 1264; Class A.

l. Light Reflectance (LR) White Panel: ASTM E 1477;
m. Dimensional Stability:
n. Recycle Content: Post-Consumer - Pre-Consumer
p. Acceptable Products:
i. METALWORKS Mesh - Expanded Metal, 8194AM No added formaldehyde as manufactured by Armstrong World Industries.
ii. McNichols
iii. Linder, LMD St-213https://www.lindner-group.com/en/fit-out-products/ceilings/expanded-metal-ceilings/
q. Trim: Bais of Design Axiom Classic Straight Perimeter Trim 4"H. Match metal panel color.

a. r. Suspension System: 360 Painted Prelude XL; Armstrong

2. SPECIALTY CEILING SYSTEM SPC-2 – ACOUSTICAL BAFFLE

a. Basis of design: Turf, product "Slab".
i. Material Minimum Performance Attributes: 1. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.

b. UL Tested ASTM E-84: Class A

c. Noise Reduction Coefficient (NRC): a. Tested in accordance with ASTM C423 for Type J ceiling mounting, per ASTM E795.

d. NRC 500hz > 0.62

e. NRC 1000hz > 0.92

f. Avg. apparent NRC: 1.5

g. Product Attributes: 1. Baffle Size: As indicated in Submittal Drawings and per Architects approval. 10" deep typical by up to 119" long or as noted on the drawings

h. Baffle Thickness: 2.25"

i. Edges: Exposed felt, machined edge.

j. Corners: Square, exposed felt, machined edge.

k. Material: Polyester (PET) felt, 60% pre-consumer recycled.

l. Color: Custom color maroon RAL # TBD.

m. Patterns: As selected by Architect from manufacturer's full range and outlined in Submittal Drawings.

n. Mounting Method: Horizontally suspended from ceiling as outlined in Submittal drawings.
i. Suspended with 3/64" steel aircraft cable, inserted into integral spring clips, supplied by manufacturer.
ii. Suspended with integrated threaded rod post.

o. Acceptable products:
i. Fräsch Blade Baffle, https://frasch.com/ceilings

ii. Acoustical Solutions, https://acousticalsolutions.com/product/alphasorb-designer-premium-acoustic-felt-ceiling-baffles/

iii. Acoufelt, Truss Ceiling Baffle, https://www.acoufelt.com/product/ceiling/baffles/truss/

iv. Arktura, Sound Bar, https://arktura.com/products/ceiling-baffles/#soundbar

v. Kineticsnoise, KleenKBAR, https://kineticsnoise.com/kleen/kbar

p. Substitutions: See Section 01 60 00 - Product Requirements

3. SPECIALTY CEILING SYSTEM SPC-3 – ACOUSTICAL BAFFLE

Basis of design: Turf, product "Slab", same as SPC-2 but color light gray

4. SPECIALTY CEILING SYSTEM SPC-4 – ACOUSTICAL BAFFLE

Basis of design: Turf, product "Slab", same as SPC-2 but color dark gray

5. SPECIALTY CEILING SYSTEM SPC-5 – DECORATIVE METAL PANELS

a. Size: Approximately 2' x 4'

b. Composition: 0.06 Aluminum 5052

c. Surface Texture: Smooth

q. Perforation: Pattern with varying sizes and shapes. Perforated pattern to be continuous across panelized system (panel edge to panel edge). Smooth inside cut faces. See proposed pattern on the drawings. As selected by Architect from manufacturer's full range and outlined in Submittal Drawings.

d. Recycled Content: 30%

e. Surface finish requirements by American Society for Testing and Materials (ASTM):

i. ASTM D3359 Standard Test Methods for Measuring Adhesion, Method B

ii. ASTM D3363 Standard Test Method for Film Hardness by Pencil Test

iii. ASTM D2794 [modified] Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)

iv. ASTM D522 [modified] Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings

v. ASTM D4060 [modified] Standard Test Method for Abrasion Resistance

f. Durability of surface finish must meet the reference standards of American Society for Testing and Materials (ASTM)

i. ASTM B117 – 09 Standard Practice for Operating Salt Spray (Fog) Apparatus

g. Acceptable products:

h. Attachment System: As designed by Unistrut.

6. ACOUSTICAL GYPSOM BOARD – GYP-2

2.02 METAL SUSPENSION SYSTEMS. GENERAL

A. Components:
   1. Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
      a. Main and cross runners to be Standard “Heavy Duty” tee bar (as per ASTM C 635).
      b. Finish: Face of main and cross runners to be factory finished matte black unless known otherwise.

B. Suspension Systems: Provide complete suspensions systems with main runners, cross runners, hangers, trim molding, seismic retention clips, load resisting struts and other suspension components required to support ceiling and other ceiling supported construction.

C. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, “Direct-Hung”, unless otherwise indicated.
   1. “Direct-Hung” Suspensions Systems: System composed of main runners supported by hangers attached directly to building structure.

D. Hangers: Type and metal standard with ceiling system manufacturer, sized to comply with structural classification indicated.
   1. Wire Hangers, where applicable, Braces, and Ties: Provide wires complying with the following requirements:
      a. Zinc-Coated Carbon-Steel Wire: ASTM A 641 (ASTM A 641M), Class 1 zinc coating, soft temper.
      b. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 2mm diameter wire.

PART 3- EXECUTION

3.01 EXAMINATION

A. Examine substrates and structural framing to which the ceiling metal panels attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect installation and anchorage, and other conditions affecting performance of metal panel ceilings.

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

3.02 PREPARATION

A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.

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

C. Survey substrate for wall attachment to assure squareness and proper elevation for wall panel installation.

D. Panel sub-structure shall be level and plumb. Panel substructure shall be structurally sound as determined by an engineer. Panel substructure shall be free of defects detrimental to work and erected in accordance with established building tolerances.
E. Coordinate panel layout and openings with mechanical, electrical and sprinkler fixtures.

3.03 INSTALLATION

A. General: Install acoustical metal pan ceilings, per manufacturers shop drawings provided, per manufacturer's written instructions and to comply with publications referenced below.
   1. ClSCA "Ceiling Systems Handbook.
   2. Standard for Ceiling Suspension System Installations - ASTM C 636.
   3. Standard for Ceiling Suspension Systems Requiring Seismic Restraint - ASTM E 580
   4. IBC (International Building Code) standard for Seismic Zone for local area.
B. Suspend ceiling hangers from building's approved structural substrates and as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
   2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, counter-splaying, or other equally effective means.
   3. Where width of ducts and other construction within ceiling plenum produce hanger spacings that interfere with location of hangers at spacing required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
C. Where used secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
D. Space hangers not more than 48 inches on center, along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches from ends of each member. Supply supporting calculations from licensed Structural Engineer verifying hanger spacing meets all requirements, when spacing exceed those recommended.
E. For faceted installations, install compression struts in accordance with manufacturer instructions.
F. Fine level grid to 1/8 inch in 10 feet from specified elevation(s), square and true.
G. Adjust suspension system runners so they are square (within .5 degree from 90 degrees) and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
H. Secure bracing wires to ceiling suspension members and to supports acceptable to Architect / Engineer and or inspector. Suspend bracing from building's structural members and / or structural deck, as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs(unless directed otherwise).
I. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical metal pan. Method of edge trim attachment and design of edge trims to be approved by Architect
   1. Screw attach moldings to substrate at intervals not more than 18” O.C. and not more than 6” from ends, leveling with ceding suspension system to a tolerance of 1/8” in 10’. Miter corners accurately and connect securely.

2. Do not use exposed fasteners, including pop rivets, on moldings and trim without prior written approval.

J. Scribe and cut acoustical metal panel units for accurate fit at penetrations by other work through ceilings. Stiffen edges of cut units as required to eliminate evidence of buckling or variations in flatness exceeding referenced standards for stretcher-leveled metal sheet.

K. Install acoustical metal panel units in coordination with suspension system.
1. Align joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions, unless otherwise indicated. Install directionally patterned or textured panels in directions indicated on approved shop drawings. Panel-joints shall flow smoothly and in a straight line within 1/8” in 10’. Intersections shall be continuous.
2. Install all full-sized panels with the spring kerfs facing in the same direction to provide access consistency
3. Fit adjoining units to form flush, tight joints. Scribe and cut units for accurate fit at borders and around construction penetrating ceiling. Install edge caps for cut units in accordance with manufacturers installation instructions.
4. Remove protective film from panels only when space is completely clean and free of airborne particles. Use white cotton gloves for final installation of panels into grid system.

3.04 ADJUSTING AND CLEANING

A. Adjust ceiling components to provide a consistent finish and appearance in conformity with established tolerances and requirements.

B. Clean exposed surfaces of acoustical metal panel ceilings and walls. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

C. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and bent units.

D. Protect ceiling panel assemblies from damage during construction. Use temporary protective coverings where needed as approved by the ceiling panel manufacturer.

END OF SECTION

SECTION 09 64 29
WOOD STRIP FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wood strip flooring, nailed:
   1. Athletic wood flooring over resilient sleeper system at Gymnasium.
B. Hardwood flooring over resilient sleeper system and accessories at Stage.
C. Secondary subflooring.
D. Resilient sleepers system.
E. Sheet vapor retarder.
F. Wall base.
G. Surface finishing and game markings.
H. Protective covering.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Concrete: Recessed concrete subfloor surface and formed depressions for deep floor sockets, inserts, and installation of vapor barrier.
B. Section 07 26 16 - Under-slab Vapor Barrier: Vapor barrier material installed below concrete slab.

1.03 REFERENCE STANDARDS

A. MFMA (SPEC) - Guide Specifications for Maple Flooring Systems; Maple Flooring Manufacturers Association; current edition.
B. MFMA PUR - Performance Uniformity Requirements
C. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials
D. APA - Plywood product standards; Plywood design specification; Plywood as a resilient floor underlayment; Steps to construct a solid, squeak-free floor system;
E. DIN – Performance Standard 18032 Part 2
F. MFMA - Floor Finish List and Specifications
G. MFMA - Grading Rules
H. WSFI - Recommendations for the Correct Preparation, Finishing, and Testing of Concrete Subfloor Surfaces to Receive Wood Flooring.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Submit the following for approval prior to placing materials orders, any fabrication, or installation:
   1. Manufacturer’s product data sheets, specifications, performance data for each type of wood flooring and finish system materials, with manufacturer’s installation instructions and recommended maintenance procedures.
   2. Wood flooring and finish system manufacturers’ standard written guarantees covering defects in materials and workmanship, clearly defining the terms included in the coverage.
   3. Submit one (1) electronic copy of shop drawings for review. Fabrication shall not commence until the Theatre Consultant and the Architect determine that the shop drawings are in compliance with the design intent of the Contract Documents. Shop drawings shall be revised and resubmitted as required.
C. Shop drawings shall include the following:

1. Measured plan drawing indicating all critical dimensions. Field verify all dimensions prior to installation.
2. Measured plan indicating placement of sleepers and staggering of substrate and surface layers as related to sleeper placement.
3. Section showing base, and section showing transitions with abutting flooring materials.
4. Details indicating expansion provisions.
5. Indicate location, size, design, and color of game markings.

D. Construction sample: Provide a finished 24 by 24 inch section of completed flooring utilizing actual system, demonstrating actual materials and finish coats.
   1. Submit one sample for each type of finish and alternate finish specified, for final selection.

E. Installation Instructions: Indicate standard and special installation procedures.

F. Maintenance Data: At the completion of the installer's work, provide 3 copies of a maintenance data binder, 2 for the owner and one for the Theatre Consultant. Binders shall include manufacturer's product data for all materials used in the floor construction and finishing, manufacturer's recommended maintenance procedures, and recommended maintenance materials. Materials shall be provided in printed and electronic (PDF) versions and bound in a three-ring binder and adequately labeled. Provide the electronic copies on thumb drives.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with MFMA (SPEC).

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

C. Installer qualifications:
   1. An experienced installer who has completed stage/athletic flooring similar in material, design, and extent to that indicated for this Project and whose work has resulted in flooring installations with a record of successful in-service performance.
   2. Installer should cite references with contact information from previous stage/athletic flooring installations.
   3. Installer specializing in applying the work of this Section with a minimum of 5 years documented experience of the type of flooring system specified.
   4. Installer shall perform work in accordance with APA and MFMA standards.

D. Single Subcontractor Responsibility: Subcontract entire floor system to a single firm for undivided responsibility. Obtain flooring of each type from single manufacturer or source, to ensure match of color, pattern, texture and quality.

1.06 FIELD CONDITIONS

A. Do not install wood flooring until wet construction work is complete and ambient air at installation space has moisture content stabilized at maximum moisture content of 40 percent.

B. Provide heat, light, and ventilation prior to installation.

C. Store materials in area of installation for minimum period of 24 hours prior to installation.

D. Maintain minimum room temperature of 65 degrees F for a period of two days prior to delivery of materials to installation space, during installation, and after installation.

PART 2 PRODUCTS

2.01 FLOOR SYSTEMS

A. Manufacturers: Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include the following:
   1. Basis of Design: Robbins, Inc., Wausau, WI: www.robbinsfloor.com.

2. Subject to compliance with requirements, the products by the following manufacturers are also acceptable:
   a. Horner Flooring Company, Inc.: www.hornerflooring.com.
   b. Action Floor Systems: www.actionfloors.com.
3. Substitutions: See Section 01 60 00 - Materials and Equipment.

B. Gymnasium and Stage Flooring:
1. Basis-of-Design Product:
   a. Robbins, Inc., Wausau, WI, “Bio-Channel Classic”
2. Subject to compliance with requirements, the products by the following manufacturers are also acceptable:
   a. Horner Flooring Company, Inc., Dollar Bay, MI, “Multi-Purpose Channel”, “low profile” version
   b. Action Floor Systems : Power Channel, Anchored Resilient

C. Strip Flooring
1. Northern hard maple, 2-1/4” (57mm) width x 25/32” (20mm) thick, 2nd & Better, T&G and end matched, kiln dried, random length.
2. Subfloor:
   a. 23/32” (18mm) Structural rated sheathing, Exposure 1 (CD-X).
3. Flooring Channels: Resilient channels consisting of a 1-1/2 by 2-5/8 inch wood engineered wood sleeper with EPDM cushion attached, factory encased in a steel channel. Sleeper must be free to move vertically within steel channel confines to assure proper uniformity of resiliency and function.
   a. EPDM Cushion: minimum 7/16 inch (11 mm) thick double-trapezoidal shaped EPDM rubber with reverse cavity having non-coextensive lower and upper surfaces.
4. Channel Anchors: Manufacturer's standard, min. 900 lb. pull-out.
5. Vapor barrier: 6-mil polyethylene.
6. Finishing Materials
   a. Oil modified polyurethane sealer and finish.
   b. Gameline paint shall be recommended by the finishing materials manufacturer and be compatible with the finish.

2.02 ACCESSORIES

A. Wall base:
1. Stage: Steel angle base, 4 by 4 inches. Base shall be securely attached to wall to withstand an upwards load of 50 pounds per linear foot. A gap between the base and the wall shall be maintained at one-quarter of an inch by bushings to allow for venting.
2. Gymnasium: Heavy duty, molded, 3" x 4" vented cove base with pre-molded outside corners.

B. Expansion Strip: Serviced Products neoprene rubber, produced and recommended for this use. Material shall be firm enough to resist abuse and compression, but suitably compressible to permit floor expansion. Provide continuously full depth of floor and subfloor at juncture of floor to vertical surface not covered by base or threshold.

C. Shim Strips:
1. Plywood or hardwood shim strips. Thickness as required to achieve overall system thickness and levelness. Type as recommended by manufacturer.
2. If required buildup is less than 2”, resilient channel shall be anchored to the concrete through the shims.
3. If required buildup exceeds 2”, shims shall be anchored to the concrete independently from resilient channel and channel shall be attached to shims using a #14 deck screw, or as recommended by the manufacturer. Shims shall be 4 inches by 4 inches minimum.

D. Filler for patching, smoothing and leveling subfloors and underlayment: Portland cement-based latex underlayment acceptable to flooring manufacturer, equal to the following:
   1. Ardex, Inc., products “Feather Flash” and “Ardex SD-P”.
   2. Quikrete Companies, product “Fast-Set Underlayment 1248”.
   3. Silpro Masonry Systems Inc., product “Masco Latex Cement”.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify concrete substrate has cured for at least 60 days. Test concrete with 3 percent solution of phenolphtalein in grain alcohol for dryness. Do not proceed with installation until substrate passes dryness test, immediately notify Architect of unacceptable substrate conditions.
B. Verify that permanent heat, light, and ventilation is complete and operational prior to installation.
C. Inspect all substrate surfaces and verify that they are in proper condition to receive the work of this Section. Verify that concrete substrate surfaces are smooth and flat to plus or minus 1/8 inch over a radius of 10 feet, free of scaling, oil, grease, dust, and foreign substance.
D. All discrepancies shall be reported in writing.
E. Commencement of installation means acceptance of site conditions by the installer.

3.02 PREPARATION

A. Comply with flooring manufacturer’s requirements for preparation of substrate to receive wood flooring.
B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
C. Thoroughly vacuum clean all receiving surfaces before commencing installation work.
D. Open bundles of flooring, and permit the pieces to properly acclimatize prior to installing same.
E. Prepare substrate to receive wood flooring in accordance with manufacturer's, MFMA, and NOFMA instructions.

3.03 SLEEPER INSTALLATION

A. Install in accordance with manufacturer’s instructions.
B. Install polyethylene vapor barrier with joints lapped a minimum of 6 inches.
C. Place resilient sleepers 16 inches on center, end to end, staggering end joints in adjacent rows. Anchor channels at predetermined locations using power actuated or pneumatic anchoring methods. Sleepers will be placed perpendicular to the proscenium opening or the intended direction of the hardboard, where applicable.
D. Install acoustical insulation between sleeper channels and at expansion voids as shown on architectural plans.
E. Install first layer of plywood subfloor with 4-foot edges parallel to sleeper channels and secure 6 inches on center into channel sleepers. The ends of the sheets shall land on sleepers. Install second layer of plywood subfloor at 90 degrees to first layer.
F. Install plywood with a 1/16” gap on non-grooved sides and 1/8” gap on grooved sides, between sheets to allow for expansion of the material.
G. Sheathing Paper: Place over wood subfloor; lap edges and ends 2 inches, staple in place.

3.04 WOOD STRIP FLOORING INSTALLATION:

A. Install in accordance with manufacturer's, MFMA, and NOFMA instructions; predrill and blind nail to sleepers.
B. Lay flooring parallel to length of room areas. Verify alignment as work progresses.
C. Arrange flooring with end matched grain set flush and tight.
D. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar; provide divider strips and transition strips in accordance with flooring manufacturer's recommendations and as indicated..
E. Install edge strips at unprotected or exposed edges, and where flooring terminates.
F. Secure edge strips before installation of flooring with stainless steel screws.
G. Install flooring tight to floor access covers.
H. Provide 2 inch expansion space at fixed walls and other interruptions.
I. Finishing:
    1. Mask off adjacent surfaces before beginning sanding.
    2. Sand flooring to smooth even finish with no evidence of sander marks. Take precautions to contain dust. Remove dust by vacuum.
    3. Apply finish in accordance with floor finish manufacturer's instructions.
    4. Apply filler and three finish coats.
    5. Apply first coat, allow to dry, then buff lightly with steel wool to remove irregularities. Vacuum clean and wipe with damp cloth before applying succeeding coat.
    6. Lightly buff between coats with steel wool and vacuum clean before applying succeeding coat.
    7. Apply colored game lines 2 inches wide and logo to layout indicated on drawings.
    8. Apply last coat of finish.

3.05 CLEANING

A. Clean and polish floor surfaces in accordance with manufacturer's instructions.

3.06 PROTECTION

A. Prohibit traffic on floor finish for 5 days after installation.
B. Place protective coverings over finished floors; do not remove coverings until Substantial Completion.
    1. Protect flooring against damage and wear with red rosin paper with taped joints during remainder of construction period to ensure that flooring and finish are without damage or deterioration at time of substantial completion.

3.07 COMMISSIONING

A. The Contractor shall work with the General Contractor or Construction Manager to arrange for a commissioning period for the work in this Section. The commissioning period shall take place at least 2 months before the first scheduled rehearsal onstage.

3.08 OWNER'S ACCEPTANCE

A. The Owner will accept the work in this Section upon the satisfactory completion of all punch list items.
B. Prior to final acceptance, the Owner reserves the right to use any completed portion of the work in this Section at no additional cost, unless said use poses a potential hazard to personnel or risks damage to the work in this Section or the work of others.
C. The Warranty period shall commence upon final acceptance by the Owner.

END OF SECTION 09 64 29

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SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Resilient sheet flooring.
- B. Resilient tile flooring.
- C. Resilient base.
- D. Resilient stair accessories.
- E. Installation accessories.

1.02 RELATED REQUIREMENTS
- A. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied resilient flooring.
- B. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.

1.03 PRICE AND PAYMENT PROCEDURES
- A. See Section 01 23 00 - Alternates, for alternates affecting the work of this section.

1.04 REFASTM D2047 ERENCE STANDARDS
- A. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine 2017.
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source 2019a, with Editorial Revision (2020).
- C. ASTM F1344 - Standard Specification for Rubber Floor Tile 2021a.
- D. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile 2020.
- E. ASTM F1861 - Standard Specification for Resilient Wall Base 2021.
- F. ASTM F1913 - Standard Specification for Vinyl Sheet Floor Covering Without Backing 2019.
- G. ASTM F2169 - Standard Specification for Resilient Stair Treads 2015 (Reapproved 2020).
- H. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source 2023.

1.05 SUBMITTALS
- A. See Section 01 30 00 - 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, 12 by 12 inch (___ by ___ mm) in size illustrating color and pattern for each resilient flooring product specified.
- F. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  1. See Section 01 60 00 - Product Requirements, for additional provisions.
  2. Extra Flooring Material: 25 square feet (2.32 square meters) of each type and color.

1.06 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.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store all materials off of the floor in an acclimatized, weather-tight space.
B. Maintain temperature in storage area between 55 degrees F (13 degrees C) and 90 degrees F (72 degrees C).
C. Protect roll materials from damage by storing on end.

1.08 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 SHEET FLOORING

A. Vinyl Sheet Flooring - Type SV-1, SV-2: Homogeneous without backing, with color and pattern throughout full thickness.
    1. Manufacturers:
        a. Tarkett; iQ Granit
        b. Substitutions: See Section 01 60 00 - Product Requirements.
    2. Description: Unbacked, nonlayered, homogeneous sheet vinyl flooring
        a. Colors and pattern detail shall be dispersed uniformly throughout the thickness of the product.
        b. Color pigments:insoluble in water and resistant to cleaning agents and light.
    3. Minimum Requirements: Comply with ASTM F1913.
    4. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
    5. Thickness: 0.080 inch nominal.
    6. Sheet Width: 6 ft. 6 inches minimum.
    7. Seams: Heat welded.
    8. Color: As indicated on drawings.
    9. Welding Rod: Solid bead in material compatible with flooring, produced by flooring manufacturer for heat welding seams, and in color matching field color.
B. Heavy Duty Safety Sheet Flooring – Type SSV-1, SSV-2: Heavy duty safety flooring is non-directional floor covering with a slip retardant particulate suspended evenly throughout the product thickness, and non-woven polyester/cellose backing with glass fiber reinforcement.
    1. Manufacturers:
        a. Altro; Classic 25
        b. Substitutions: See Section 01 60 00 - Product Requirements.
    2. Minimum requirements: Comply with ASTM F1303-2, Type 2, Grade 1, Class A moisture resistant backing
    3. Acceptable material: Altro Classic 25.
    4. ASTM D2047z: 0.9 Dry, 1.0 Wet
    5. Thickness: 10 inches (2.5 mm)
    6. Roll Width: 66 inches (20 m)
    7. Color: As indicated on drawings.

8. Accessories:
    a. Vinyl welding rod
    b. Cove former
    c. Gulley edge
    d. Cap strip
    e. Metal edge strips

2.02 TILE FLOORING

A. Luxury Vinyl Tile [LVT-1, LVT-2, LVT-3, LVT-4]:
    1. Manufacturers:
        a. Tandus Centiva; Contour series.
        b. Substitutions: See Section 01 60 00 - Product Requirements.
    2. Minimum Requirements: Comply with ASTM F1700, Class III, Type B.
    3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648, NFPA 253, ASTM E 648, or NFPA 253.
    4. VOC Content Limits: As specified in Section 01 61 16.
    5. Tile Size: 18 by 18 inch (457 by 457 mm).
    6. Edges: Square
    7. Wear Layer Thickness: 0.032 inch (0.8 mm).
    8. Total Thickness: 0.120 inch (3 mm).
    9. Color: As indicated on drawings.

B. Quartz Tile [QT-1, QT-2, QT-3, QT-4]: Homogeneous combination of high quality vinyl, calcium carbonate, and fine and naturally weathered quartz.
    1. Manufacturers:
        a. Basis of Design: Altro Flooring; Altro Quartz Tile: www.altrofloors.com.
        b. Other Approved Manufacturers:
            1) Kahrs Flooring; Quartz: www.kahrsfooring.com.
        c. Substitutions: See Section 01 60 00 - Product Requirements.
    2. Description: Homogeneous combination of high quality vinyl, calcium carbonate, and fine and naturally weathered quartz. Altro Quartz Tile meets the requirements of ASTM F1066, Class l, Type A
    3. Minimum Requirements: ASTM F1066, Class l, Type A
    4. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648.
    5. Square Tile Size: 24 by 24 inch, nominal.
    6. Thickness: 0.08 inch, 2 mm.
    7. Color: As indicated on drawings.

C. Rubber Tile - Type ____ - Type RT-1, RT-2, RT-3, RT-4: Homogeneous, color and pattern throughout thickness Homogeneous, color and pattern throughout thickness.
    1. Manufacturers:
        a. Tarkett; Color Splash Resilient Rubber Floor Tiles: www.johnsonite.com..
        b. Substitutions: See Section 01 60 00 - 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 E 648, NFPA 253, ASTM E 648, or NFPA 253.
    4. VOC Content Limits: As specified in Section 01 61 16.
    5. Size: 24 by 24 inch (610 by 610 mm) nominal.
    6. Total Thickness: 0.125 inch (3.2 mm).
    7. Texture: Hammered.
    8. Color: As indicated on drawings.

2.03 STAIR COVERING

A. Stair Treads [RSC-1]: Rubber Rubber; full width and depth of stair tread in one piece; tapered thickness.
   1. **Manufacturers:**
      a. Tarkett; Angle Fit Rubber Stair Treads: www.tarkett.com..
      b. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Minimum Requirements: Comply with ASTM F2169, Type TS, rubber, vulcanized thermoset.
   3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648, NFPA 253, ASTM E 648, or NFPA 253.
   4. Nominal Thickness: 0.095 inch (2.4 mm).
   5. Nosing: Square.
   6. Striping: 2 inch (24 mm) wide contrasting color strips.
   7. Texture: hammered.
   8. Pattern: random variegated.
   9. Color: To be selected by Architect from manufacturer's full range.
B. Stair Nosings: 1-1/2 inch (38 mm) horizontal return, 1-1/8 inch (28.5 mm) vertical return, full width of stair tread in one piece.

2.04 RESILIENT BASE

A. Resilient Base [Type RB-1, RB-2, RB-3, RB-4]: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove.
   1. Manufacturers:
      a. Johnsonite, a Tarkett Company: www.johnsonite.com/#sle.
      b. Mannington Commercial: www.manningtoncommercial.com#sle.
      c. Roppe Corporation: www.roppe.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648, NFPA 253, ASTM E 648, 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: Color as selected from manufacturer's standards.
B. Millwork Rubber Base, Type MRB-1:
   1. Minimum Requirements: ASTM F-1861 Standard Specification for Resilient Wall Base, Type TP, and Group 1.
   2. Manufacturer and Product: Tarkett Mandalay 6": www.tarkett.com.
      a. Substitutions: See Section 01 60 00 - Product Requirements.
   3. Configuration: 3/8" (9.52 mm) thick by 6" (152 mm) height with a 45° angular top.

2.05 ACCESSORIES

A. Subfloor Filler: Standard latex premixed type for other areas; type recommended by adhesive material manufacturer.
B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
C. Moldings, Transition and Edge Strips: Manuacturer's standard material.
   1. Product: Transition strip manufactured by Roppe or Johnsonite.
D. Sealer and Wax: Types recommended by flooring manufacturer.

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 in accordance with Section 09 05 61.
    2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
    3. Follow moisture and alkalinity remediation procedures in Section 09 05 61.
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.

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. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
H. Install flooring in recessed floor access covers, maintaining floor pattern.

3.04 INSTALLATION - SHEET FLOORING

A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns at seams.
B. Cut sheet at seams in accordance with manufacturer's instructions.
C. Seal seams by heat welding where indicated for Safety Sheet Vinyl.
D. Chemically bond seams using seam sealer where indicated for Sheet Vinyl.

3.05 TILE/PLANK FLOORING

A. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.
B. Install square tile to basket weave pattern, unless noted otherwise. Allow minimum 1/2 full size tile width at room or area perimeter.
C. Install plank tile with a random offset of at least 6 inches (152 mm) from adjacent rows.

3.06 INSTALLATION - RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 24 inches (610 mm) between joints.
B. Install base on solid backing. Bond tightly to wall and floor surfaces.
C. Scribe and fit to door frames and other interruptions.

3.07 INSTALLATION - STAIR COVERINGS

A. Install stair coverings in one piece for full width and depth of tread.
B. Adhere over entire surface. Fit accurately and securely.

3.08 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.
B. Clean in accordance with manufacturer's written instructions.

3.09 PROTECTION

A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION 09 65 00

SECTION 09 65 66
RESILIENT ATHLETIC FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Rubber tile, adhesively installed.
- B. Accessories.

1.02 RELATED REQUIREMENTS
- A. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied flooring.
- B. Section 09 05 61 - Common Work Results for Flooring Preparation: Independent agency testing of concrete slabs, cleaning, and preparation.
- C. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.
- D. Section 09 65 00 - Resilient Flooring.

1.03 REFERENCE STANDARDS
- A. DIN EN 14904 - Surfaces for Sports Areas – Indoor Surfaces for Multi-Sports Use – Specification 2006.

1.04 SUBMITTALS
- A. Product Data: Manufacturer's printed data sheets for products specified.
- B. Selection Samples: Manufacturer's color charts for flooring materials specified and game line paints, indicating full range of colors and textures available.
- C. Verification Samples: Actual flooring material specified, not less than 12 inch (305 mm) square, mounted on solid backing.
- D. Test Reports: Submit test reports showing compliance with DIN EN 14904.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  1. See Section 01 60 00 - Product Requirements, for additional provisions.
  2. Extra Flooring Material: 10 square yards (9 sq m) matching installed flooring.

1.05 QUALITY ASSURANCE
- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least five years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING
- A. Deliver materials to project site in unopened containers clearly labeled with manufacturer's name and identification of contents.
- B. 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.

1.07 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. Sport Rubber, Type SR-1, SR-2:
   1. Minimum Requirements: ASTM F1344, Type II, B – Mottled, Grade 2.
   2. Thickness: Minimum 3/8 inch (10 mm).
   3. Size, Interlocking Edge Tile: Nominal 24 inches by 24 inches (609 mm by 609 mm).
   4. Thickness: 375” (9.5 mm)
   5. Wear layer thickness: 0.090" (2.3 mm).
   6. Surface Texture: hammered.
   7. Color: As selected from manufacturer's standard range.
   8. Products:
      a. Tarkett; Triumph Multi-Functional and Sports Rubber Tile
      b. Substitutions: See Section 01 60 00 - 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.

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 in accordance with Section 09 05 61.
   2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
   3. Follow moisture and alkalinity remediation procedures in Section 09 05 61.

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.

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 09 65 66

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SECTION 09 66 16
PRECAST CEMENT TERRAZZO TREADS AND LANDINGS

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Precast Portland cement terrazzo units: stair treads, landings and risers.

1.02 RELATED REQUIREMENTS
- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete subfloor with wood float finish.
- B. Section 05 51 00 - Metal Stairs: Formed steel stair pans.
- C. Section 07 92 00 - Joint Sealants: Sealing joints between terrazzo work and adjacent construction and fixtures.
- D. Section 09 66 23 - Resinous Matrix Terrazzo Flooring.

1.03 PRICE AND PAYMENT PROCEDURES
- A. See Section 01 23 00 - Alternates, for alternates affecting the work of this section.

1.04 REFERENCE STANDARDS
- A. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar 2019.
- B. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2022.
- C. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2023.
- D. ASTM C150/C150M - Standard Specification for Portland Cement 2022.
- E. NTMA (SPECS) - NTMA Terrazzo Specifications Current Edition.

1.05 SUBMITTALS
- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for terrazzo units; include printed copy of current NTMA recommendations for the type of terrazzo specified.
- C. Shop Drawings:
  1. Submit shop drawings of all precast terrazzo items showing detailed sections and profile for all precast items. Details shall show all reinforcing and special hardware for fastening.
- D. Samples: Submit two samples, 6 by 6 inch (150 by 150 mm) in size illustrating color, chip size and variation, chip gradation, and mortar color..
- E. Cleaning and Maintenance Data: Include procedures for stain removal, stripping, and sealing.

1.06 QUALITY ASSURANCE
- A. Perform work in accordance with NTMA recommendations as posted on their web site at www.ntma.com.
- B. Manufacturer's Instructions: In addition to specified requirements, comply with precast terrazzo manufacturer's instructions and recommendations for substrate preparation, materials storage, mixing and application, finishing and curing.
- C. Installer Qualifications: Company specializing in performing the work of this section with not fewer than five years of documented experience.

1.07 DELIVERY, STORAGE AND HANDLING
- A. Packaging and Shipping: Precast terrazzo to be palletized and shrink wrapped, delivered in original unopened packaging.

B. Storage and Protection: Precast terrazzo to be stored indoors, sheltered from moisture in original packaging. Protect from damage by other trades.

1.08 FIELD CONDITIONS

A. Do not install terrazzo when temperature is below 50 degrees F (10 degrees C) or above 90 degrees F (32 degrees C).

B. Maintain temperature within specified range 24 hours before, during, and 72 hours after installation of terrazzo.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design:
   1. Wausau Tile, Inc.: www.wausautile.com.

B. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS

A. Portland Cement: ASTM C-150 Specifications for Portland Cement.

B. Aggregates: All aggregates to meet ASTM C-33 specifications, cleaned and properly graded to size. Aggregate shall be blended to meet individual project requirements.

C. Marble chips, size to conform with NTMA gradation standards.

D. Coloring; Pigments used shall be inorganic, resistant to alkalinity and used per manufacturer's recommendations.

E. Reinforcement and Hardware:
   1. To conform with NTMA and Manufacturer's design.
   2. Reinforce precast with deformed rods or wire mesh or both as recommended by precast terrazzo manufacturer.

F. Abrasive Inserts: Shall consist of silica sand and black epoxy, three lines.

G. Caulks & Sealants:
   1. Urethane or Polyurethane Sealant
   2. Color to be selected by Architect from manufacturers full range of colors.

H. Cleaner: Liquid neutral chemical cleaner, with pH factor between 7 and 8, of formulation recommended by sealer manufacture for type of precast terrazzo used and complying with NTMA requirements.

I. Sealer: Colorless, slip and stain-resistant penetrating sealer with pH factor between 7 and 8, that does not affect color or physical properties of precast terrazzo surface. Flash point (ASTM D56): 80 degrees F, Minimum.

2.03 PERFORMANCE REQUIREMENTS:

A. Compressive Strength: 4000 psi, minimum.

B. Flexural Strength 600 psi, minimum.

C. Certification: Suppliers shall furnish certification attesting that materials meet specification requirements.

2.04 PRECAST PORTLAND CEMENT TERRAZZO UNITS

A. Precast Portland Cement Terrazzo Units: Portland cement matrix, ASTM C150/C150M; cleaned and graded aggregate sized in accordance with NTMA gradation standards.
   1. Fabricate to sizes and profiles shown on drawings.
      a. Thickness: 2 inches (50 mm).
   2. Setting Material: Latex Portland cement mortar, ANSI A118.4.

3. Anchors and Reinforcement for Precast Units: As recommended by manufacturer for type of installation.

B. Sizing Tolerances:
   1. All units to conform to shop drawings with a 1/16" tolerance in dimension.
C. All exposed edges to be ground and polished with a minimum of 1/16" bevel.
D. All finished surfaces to be ground and polished, free of holes and to have overall uniformity in matrix and aggregate.
E. All precast terrazzo finished surfaces to be sealed with a sealer approved by manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that substrate surfaces are ready to receive work.
B. Do not begin terrazzo work until concrete substrate has cured 28 days, minimum, and has dried to a maximum moisture content of 12 percent.

3.02 PREPARATION
A. Clean substrate of foreign matter.
B. Remove loose or flaking concrete and repair to form sound, solid substrate.

3.03 INSTALLATION - PRECAST PORTLAND CEMENT TERRAZZO UNITS
A. Anchor precast units as shown on drawings.
B. Install precast units using specified setting material.
C. Install anchors as shown on approved shop drawings.
D. Fill joints between with manufacturer - approved sealant or as specified.

3.04 TOLERANCES
A. Maximum Variation from Flat Surface: 1/8 inch in 10 feet (3 mm in one m).
B. Maximum Variation from Level (Except Surfaces Sloping to Drain): 1/8 inch (3 mm).

3.05 CLEANING
A. Scrub and clean terrazzo surfaces with cleaner in accordance with NTMA instructions. Let dry.

3.06 PROTECTION
A. Do not permit construction traffic over finished terrazzo surfaces.

END OF SECTION 09 66 16

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SECTION 09 66 23
RESINOUS MATRIX TERRAZZO FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Epoxy matrix terrazzo with ground and polished finish.
- B. Divider strips.
- C. Precast epoxy terrazzo wall base.

1.02 RELATED REQUIREMENTS
- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete subfloor with steel trowel finish.
- B. Section 07 92 00 - Joint Sealants: Sealing joints between terrazzo work and adjacent construction and fixtures.
- C. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.
- D. Section 09 66 16 - Precast Cement Terrazzo Treads and Landings.
- E. Section 09 67 00 - Fluid-Applied Flooring: Resinous flooring that is not ground.

1.03 PRICE AND PAYMENT PROCEDURES
- A. See Section 01 23 00 - Alternates, for alternates affecting the work of this section.

1.04 REFERENCE STANDARDS
- A. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar 2019.
- B. NTMA (GRAD) - Aggregate Gradation Standards Current Edition.
- C. NTMA (EPOXY) - Epoxy Terrazzo Specifications Current Edition.

1.05 SUBMITTALS
- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for divider strips, control joint strips, expansion joints, and sealer; include printed copy of current NTMA recommendations for type of terrazzo specified.
- C. Shop Drawings: Indicate divider strip and control and expansion joint layout, and details of adjacent components. For precast units, detail profile and anchorage requirements.
- D. Samples: Submit two samples, 6 inch (152 mm) by 6 inch (152 mm) in size illustrating color, chip size and variation, chip gradation, matrix color, and typical divider strip.
- E. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.
- H. Cleaning and Maintenance Data: Include procedures for stain removal, stripping, and sealing.

1.06 QUALITY ASSURANCE
- A. Perform work in accordance with NTMA recommendations as posted at their web site at www.ntma.com.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section.
  1. Minimum five years of documented experience.
  2. Associate member firm of the National Terrazzo and Mosaic Association, Inc.
- C. Installer Qualifications: Company specializing in performing the type of work specified in this section.

1. Minimum five years of documented experience.
2. Approved by matrix manufacturer.
3. Contractor member of the National Terrazzo and Mosaic Association, Inc.

D. Pre-installation Conference: Conduct conference at project site to comply with requirements in Section 01 20 00 – Project Meetings. Review methods and procedures related to terrazzo including, but not limited to, the following:
1. Inspect and discuss installation procedures, joint details, job site conditions, substrate specification, vapor barrier details and coordination with other trades.
2. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
3. Review special terrazzo designs and patterns.
4. Review plans for concrete curing and site drying to enable timely achievement of suitable slab moisture conditions.

1.07 MOCK-UP

A. Construct mock-up of terrazzo illustrating appearance of finished work in each configuration required. Size mock-up to be not less than 3 by 3 feet (1 by 1 m).
B. Locate where directed.
C. Mock-up may not remain as part of the work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Store terrazzo materials in a dry, secure area.
B. Maintain minimum temperature of 60 degrees F (16 degrees C).
C. Keep products away from fire or open flame.

1.09 FIELD CONDITIONS

A. Do not install terrazzo when temperature is below 60 degrees F (15.5 degrees C) or above 90 degrees F (32 degrees C).
B. Maintain temperature within specified range 72 hours before, during, and 72 hours after installation of flooring.
C. Prior to and during each day of installation, the terrazzo contractor shall verify that the dew point is at least 5ºF (-15ºC) less than the slab and air temperature.
D. Provide ambient lighting level of 50 ft candles (540 lx), measured at floor surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design - Resinous Matrix Terrazzo Flooring: Terrazzo & Marble Supply Companies; Terroxy Resin Systems: www.tmsupply.com/#sle.
B. Other Acceptable Manufacturers - Resinous Matrix Terrazzo Flooring:
1. Sika Corporation; Sikafloor Terrazzo: www.sikafloorusa.com/#sle.
2. Terrazzco, a Brand of Concord Terrazzo Company, Inc: www.terrazzco.com/#sle.
3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 EPOXY MATRIX TERRAZZO APPLICATIONS

A. Floors [TERR-1, TERR-2, TERR-3, TERR-4, TERR-5] :
1. Thickness: 3/8 inch (9 mm), nominal.
2. Aggregate Type: Marble chips.
3. Aggregate Size: No. 1 - 2.

B. Wall Base: TB-1 .
1. Thickness: Same as floors.
2. Style: Straight, top edge eased.

3. Color(s): As indicated on drawings.
4. Aggregate Type and Size: Same as floors.

2.03 MATERIALS

A. Epoxy Matrix Terrazzo: Aggregate and matrix mix applied to substrate, troweled flat, and ground smooth.
   1. Mix Proportions: As required to achieve appearance specified.
B. Matrix: Two component resin and epoxy hardener with mineral filler and color pigment, non-volatile, thermo-setting.
C. Aggregate: Type as indicated; sized in accordance with NTMA aggregate gradation standards; color(s) as indicated, uniform in color.
D. Finishing Grout: Epoxy, color to match terrazzo matrix.
E. Precast Epoxy Terrazzo Units: Fabricate to sizes and profiles indicated on drawings.
   1. Setting Material: Latex Portland cement mortar, ANSI A118.4.

2.04 ACCESSORIES

A. Divider Strips: 1/8 inch (3 mm) thick zinc exposed top strip, zinc coated steel concealed bottom strip, with anchoring features.
B. Control Joint Strips: 1/8 inch (3 mm) nominal width zinc exposed top strips, zinc coated steel concealed bottom strips, 1/8 inch (3 mm) wide neoprene filler strip between vertical strips, with anchoring features.
C. Divider and Control Joint Strip Height: To suit thickness of terrazzo topping, with allowance for grinding.
D. Base Divider Strip: Match divider strips.
E. Anchors and Reinforcement for Precast Units: As recommended by manufacturer for type of installation.
F. Sealer: Colorless, non-yellowing, penetrating liquid type to completely seal matrix surface; not detrimental to terrazzo components.
   1. Products:
      a. Terroxy WB Acrylic Plus.
G. Primer: Terroxy Primer.
   1. Substitutions: See Section 01 60 00 - Product Requirements.
H. Moisture Vapor Treatment: Terroxy Resin Systems; Moisture Vapor Treatment.
   1. Substitutions: See Section 01 60 00 - Product Requirements.
I. Flexible Reinforcing Membrane: Terroxy Resin Systems: Iso-Crack Epoxy Membrane.
   1. Substitutions: See Section 01 60 00 - Product Requirements.

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 terrazzo.
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 terrazzo.
C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of materials to subfloor surfaces.
D. Cementitious Subfloor Surfaces: Verify that substrates are ready for terrazzo flooring installation by testing for moisture and alkalinity (pH).

1. Test in accordance with Section 09 05 61.
2. Obtain instructions if test results are not within limits recommended by terrazzo flooring manufacturer.

E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Clean substrate of foreign matter.
B. Prepare concrete subfloor in accordance with manufacturer's instructions.
   1. Mechanically abrade floor by shot blasting. Surface preparation results should achieve a CSP3-CSP5 profile according to International Concrete Repair Institute Guideline No. 03732.
   2. Repair or level damaged and deteriorated concrete according to manufacturer’s instructions for thin-set epoxy terrazzo
   3. Repair cracks and non-expansion joints greater than 1/16” (1.6 mm) wide according to NTMA Tech Bulletin T-24.
C. Note: Regardless of testing Install moisture vapor treatment on all slab on grade and/or lightweight concrete conditions.
D. Apply primer in accordance with manufacturer's instructions.

3.03 EPOXY TERRAZZO INSTALLATION

A. General:
   1. Comply with NTMA’s written recommendations for terrazzo and accessory installation.
   2. Place, rough grind, grout, cure grout, fine grind and finish terrazzo according to manufacturer’s instructions and NTMA’s “Terrazzo Specifications and Design Guide.”
B. Install control joint strips straight and flat to locations indicated.
C. Expansion Joint Strips: Separate double L-type angles, positioned back to back with minimum 1/8” (3.2 mm) width between. Fill area between strips with semi-flexible joint filler.
D. Install divider strips according to pattern approved on shop drawings.
E. Install base and border divider and control joint strips to match floor pattern.
F. Place terrazzo mix over substrate to thickness indicated.
   1. Mix epoxy matrix with chips and fillers in ratios directed by manufacturer.
   2. Trowel apply terrazzo mixture over epoxy primer to provide a dense flat surface to top of divider strips. Allow to cure per manufacturer’s recommendations before rough grinding.
G. Anchor precast units as indicated on drawings.
H. Install precast units using specified setting material.

3.04 FINISHING

A. Finish terrazzo to NTMA requirements.
B. Ensure that matrix components and fluids from grinding operations do not stain terrazzo by reacting with divider and control-joint strips.
C. Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted.
D. Produce terrazzo finish surface to match approved mock-up, with 70 percent chip exposed.
E. Grind terrazzo surfaces with power disc machine; sequence with coarse to fine grit abrasive, using a wet method or using a dry grinder with vacuum to control dust.
F. Apply grout to fill voids exposed from grinding.
G. Remove grout coat by grinding, using a fine grit abrasive.
H. Hand grind vertical and curved surfaces similarly.

3.05 PRECAST TERRAZZO INSTALLATION

A. Install precast units using method recommended by NTMA and manufacturer unless otherwise indicated.
B. Seal joints between units with joint sealants.

3.06 TOLERANCES

A. Maximum Variation from Flat Surface: 1/4 inch in 10 feet (6 mm in one m).
B. Maximum Variation from Level (Except Surfaces Sloping to Drain): 1/8 inch (3 mm).

3.07 CLEANING

A. Scrub and clean terrazzo surfaces with neutral pH cleaner in accordance with manufacturer's instructions. Let dry.
B. Immediately after terrazzo has dried, apply sealer in accordance with manufacturer's instructions.
C. Polish surfaces in accordance with manufacturer's instructions.

3.08 PROTECTION

A. Protect finished terrazzo from damage due to subsequent construction until Date of Substantial Completion.

END OF SECTION 09 66 23

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SECTION 09 67 00
FLUID-APPLIED FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Fluid-applied flooring and base.

1.02 RELATED REQUIREMENTS
- A. Section 07 92 00 - Joint Sealants: Sealing joints between fluid-applied flooring and adjacent construction and fixtures.
- B. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.
- C. Section 09 30 00 : Sloped mortar bed for shower areas.
- D. Section 09 66 23 - Resinous Matrix Terrazzo Flooring

1.03 REFERENCE STANDARDS
- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source 2019a, with Editorial Revision (2020).
- B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2022.
- C. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair 2013.

1.04 SUBMITTALS
- A. See Section 01 30 00 - 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, 4 by 4 inch (101 by 101 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.

1.05 QUALITY ASSURANCE
- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Applicator Qualifications: Company specializing in performing the work of this section.
  1. Minimum five years of documented experience.
  2. Approved by manufacturer.

1.06 MOCK-UPS
- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Construct mock-up(s) of fluid applied flooring to serve as basis for evaluation of texture and workmanship.
  1. Number of Mock-Ups to be Prepared: One.

2. Use same materials and methods for use in the work.
3. Locate where directed.
4. Minimum Size: 48 inches by 48 inches (1220 mm by 1220 mm).

C. Obtain approval of mock-up by Architect before proceeding with work.

D. Approved mock-up may remain as part of the work.

1.07 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.

1.08 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. Sherwin-Williams High-Performance Flooring: www.sherwin-williams.com/resin-flooring/#sle.
3. Basis of Design: Stonhard: www.stonhard.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FLUID-APPLIED FLOORING SYSTEMS

A. Fluid-Applied Flooring and Base Type PEF-1: Polyurethane mortar base coat(s) with broadcast flakes.

1. Physical Characteristics:
   a. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E 648.
   b. Tensile Strength: 1,000 psi, when tested in accordance with ASTM D 638.
   c. Compressive Strength: 5,000 psi (34.45 MPa) , when tested in accordance with ASTM C 579.
   d. Abrasion Resistance: Maximum weight loss of .03 g/1000 cycles, when tested in accordance with ASTM D 4060.
   e. Impact Resistance: >160 in/lb; no cracking, chipping or delamination, when tested with Gardner Impact Tester.
2. System Thickness: 3/16 inch (4.76 mm), nominal, dry film thickness (DFT).
3. Texture: Slip resistant.
4. Color: As selected by Architect.
5. Manufacturers and products:
   a. Basis of Design: Stonhard; Product: Stontec TRF: www.stonhard.com
      1) 3 mm urethande flake broadcast flooring system with integral cove base where noted
      2) Primer as required by manufacturer, one coat minimum.
      3) Body Coat(s): Stonclad UR, urethane, 100% solids.
      4) Undercoat: Stontec epoxy undercoat
      5) Color Flake Broadcast Layer: Brightly colored vinyl flakes.
      6) Undercoat and Sealer: Stonseal CA7, a two-component, UV resistant,aliphatic polyaspartic urethane sealer..

b. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 ACCESSORIES

A. Mortar bed at sloped shower areas: See Section 09 30 00 .
B. Waterproofing at shower areas: Stonproof ME7 membrane system with Texture #3 broadcast to refusal.
C. Crack Treatment: Stonhard's Stonproof CT5 or RH7 with Texture #3 broadcast to refusal
D. Patching, Leveling and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated. No Single component or cementitious materials.
E. Base Caps: Zinc with projecting base of 1/8 inch (3 mm); color as selected.
F. Cant Strips: Molded of flooring resin material.
G. Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated.
H. Primer: Type recommended by fluid-applied flooring manufacturer.

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. Cementitious Subfloor Surfaces: Verify that substrates are ready for fluid-applied flooring installation by testing for moisture and alkalinity (pH).
    1. Test in accordance with Section 09 05 61.
    2. Obtain instructions if test results are not within limits recommended by fluid-applied flooring manufacturer.
    3. Follow moisture and alkalinity remediation procedures in Section 09 05 61.
E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.
B. Prepare concrete surfaces according to ICRI 310.2R, CSP 3.
C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Grind irregularities above the surface level. Prohibit traffic until filler is cured.
D. Vacuum clean substrate.
E. At shower areas, install waterproofing membrane in accordance with manufacturers requirements.
F. Apply primer in accordance with flooring manufacturers requirements.

3.03 INSTALLATION - ACCESSORIES

A. Install cant strips at base of walls where flooring is to be extended up wall as base.
B. Install terminating cap strip at top of base; attach securely to wall substrate.

3.04 INSTALLATION - FLOORING

A. Apply in accordance with manufacturer's instructions.
B. Apply each coat to minimum thickness required by manufacturer.
C. Finish to smooth level surface.
D. Integral Cove Base: 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.
E. Mortar: Mix mortar material according to manufacturer's recommended procedures. Uniformly spread mortar over substrate at manufacturer’s recommended height using specially designed trowel and or Screed box.
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 in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer.
I. Install flooring in recessed type floor access covers.
J. Cove at vertical surfaces: Base height: 6" unless otherwise indicated.

3.05 TERMINATIONS

A. Chase edges to “lock” the flooring system into the concrete substrate along lines of termination.
B. Penetration Treatment: Lap and seal the flooring system onto the perimeter of the penetrating item 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.

3.06 JOINTS AND CRACKS

A. Treat control joints to bridge potential cracks and to maintain monolithic protection.
B. Treat cold joints and construction joints to bridge potential cracks and to maintain monolithic protection on horizontal and vertical surfaces as well as horizontal and vertical interfaces.
C. Discontinue floor coating system at 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.

3.07 CURING, PROTECTION AND CLEANING

A. Cure resinous flooring materials in compliance with manufacturer's directions.
    1. Prohibit traffic on floor finish for 48 hours after installation.
    2. Barricade area to protect flooring until fully cured.
B. Protect resinous flooring materials from damage and wear during construction operation. Comply with manufacturer's recommendations for temporary covering materials and method of application.

C. Cleaning: Remove temporary covering and clean resinous flooring prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer.

END OF SECTION 09 67 00

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SECTION 09 68 13
TILE CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Carpet tile, fully adhered.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors.
B. Section 09 05 61 - Common Work Results for Flooring Preparation: Independent agency testing of concrete slabs, cleaning, and preparation.
C. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.
D. Section 09 68 16 - Sheet Carpeting: Broadloom carpet.
E. Section 09 69 33 - Low-Profile Fixed Height Access Flooring

1.03 REFERENCE STANDARDS

A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials 2016 (Reapproved 2021).
B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source 2019a, with Editorial Revision (2020).
C. CRI 104 - Standard for Installation of Commercial Carpet 2015.
D. CRI (GLP) - Green Label Plus Testing Program - Certified Products Current Edition.
E. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source 2023.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
C. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.
D. Submit two, 6 inch (152 mm) long samples of edge strips.
E. Manufacturer's Installation Instructions: Indicate special procedures.
F. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
    1. See Section 01 60 00 - Product Requirements, for additional provisions.
    2. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.
B. Installer Qualifications: Company specializing in installing carpet tile with minimum three years documented experience and approved by carpet tile manufacturer.

1.06 FIELD CONDITIONS

A. Store materials in area of installation for minimum period of 24 hours prior to installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Tile Carpeting:
   1. Basis of Design: ShawContract: www.shawcontract.com.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS

A. Carpet Tile Type CT-1, CT-2, CT-3: Tufted, manufactured in one color dye lot.
   1. Product: “Noble” Collection manufactured by Shaw.
   2. Tile Size: 24 x 24 inch (610 x 610 mm), nominal.
   3. Pile Thickness: 0.117 inch (2.97 mm).
   4. Dye method: 100% solution dyed.
   5. Color: as indicated.
   6. Pattern: quarter turn.
   7. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
   8. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
   9. Primary Backing Material: Synthetic non-woven.
   10. Secondary Backing Material: Modular.
   11. Tufted Weight: 26 oz/sq yd (881 g/sq m).

B. Walk-off Carpet Tile [Type WOC -1]: Tufted, manufactured in one dye lot.
   1. Product: “All Access” Collection, Divvy Tile, as Manufactured by Shaw.
   2. Tile Size: 24 by 24 inch, nominal.
   3. Tufted weight: 30 oz./cu. yd.
   4. Color: As indicated.

2.03 ACCESSORIES

A. Sub-Floor Filler: White premix latex; type recommended by flooring material manufacturer.

B. Edge Strips: Rubber, color as selected.

C. Stair Nosing: As specified in Section 09 65 00.

D. Adhesives:
   1. Compatible with materials being adhered; maximum VOC content of 50 g/L; CRI (GLP) certified; in lieu of labeled product, independent test report showing compliance is acceptable.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.

B. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.

C. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
   1. Test in accordance with Section 09 05 61.
   2. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.
   3. Follow moisture and alkalinity remediation procedures in Section 09 05 61.

D. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Prepare floor substrates for installation of flooring in accordance with Section 09 05 61.

3.03 INSTALLATION

A. Starting installation constitutes acceptance of sub-floor conditions.
B. Install carpet tile in accordance with manufacturer's instructions.
C. Blend carpet from different cartons to ensure minimal variation in color match.
D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
E. Lay carpet tile in square pattern, with pile direction alternating to next unit, set parallel to building lines, unless otherwise indicated.
F. Locate change of color or pattern between rooms under door centerline.
G. Fully adhere carpet tile to substrate.
H. Trim carpet tile neatly at walls and around interruptions.
I. Complete installation of edge strips, concealing exposed edges.

3.04 CLEANING

A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
B. Clean and vacuum carpet surfaces.

END OF SECTION 09 68 13

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SECTION 09 68 16
SHEET CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Carpet, direct-glued.
- B. Accessories.

1.02 RELATED REQUIREMENTS
- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied carpet.
- C. Section 09 05 61 - Common Work Results for Flooring Preparation: Independent agency testing of concrete slabs, removal of existing floor coverings, cleaning, and preparation.
- D. Section 09 68 13 - Tile Carpeting.

1.03 REFERENCE STANDARDS
- A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials 2016 (Reapproved 2021).
- B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source 2019a, with Editorial Revision (2020).
- C. CRI 104 - Standard for Installation of Commercial Carpet 2015.
- D. CRI (GL) - Green Label Testing Program - Certified Products Current Edition.
- E. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source 2023.

1.04 SUBMITTALS
- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Samples: Submit two samples 24 by 24 inch (609 by 609 mm) in size illustrating color and pattern for each carpet material specified.
- D. Submit two, 6 inch (152 mm) long samples of edge strip for each color specified.
- E. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  1. See Section 01 60 00 - Product Requirements, for additional requirements.
  2. Extra Carpet: 100 sq ft (9.29 sq m) of each type, color, and pattern installed.

1.05 QUALITY ASSURANCE
- A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing carpet with minimum three years documented experience.

1.06 FIELD CONDITIONS
- A. Store materials in area of installation for minimum period of 24 hours prior to installation.
- B. Maintain minimum 70 degrees F (21 degrees C) ambient temperature 24 hours prior to, during and 24 hours after installation.

C. Ventilate installation area during installation and for 72 hours after installation.

PART 2 PRODUCTS

2.01 CARPET

A. Carpet, Type BC-1:
   1. Product: Angulate, as manufactured by Tarkett.
   2. Roll Width: 6 ft (1828 mm).
   3. Color: as indicated.
   4. Pattern: as indicated.
   5. Critical Radiant Flux: Minimum of 0.22 watts/sq cm, when tested in accordance with ASTM E648 or NFPA 253.
   6. Surface Flammability Ignition: Pass ASTM D2859 (the "pill test").
   7. Gage: 5/64 inch (50.4 rows/100 mm).
   8. Stitches: 10.8 per inch (42.5 per cm).
   9. Dye Method: 75% Solution Dyed / 25% Yarn Dyed
   10. Face Weight: 21.0 oz/sq yd (712 gm/sq m).
   11. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ACCESSORIES

A. Sub-Floor Filler: Type recommended by carpet manufacturer.
B. Edge Strips: Rubber, color as selected.
C. Stair Nosing: Tarkett VIVCD-XX
D. Stair Nosing: As specified in Section 09 65 00.
E. Adhesives:
   1. Compatible with materials being adhered; maximum VOC content of 50 g/L; CRI (GL) certified.
F. Seam Adhesive: Recommended by carpet manufacturer.
G. Carpet Adhesive: Recommended by carpet manufacturer.

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 carpet.
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 carpet.
C. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesives to subfloor surfaces.
D. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
   1. Test in accordance with Section 09 05 61.
   2. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.
   3. Follow moisture and alkalinity remediation procedures in Section 09 05 61.
E. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Prepare floor substrates for installation of flooring in accordance with Section 09 05 61.

3.03 INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install carpet in accordance with manufacturer's instructions and CRI 104 (Commercial).
C. Verify carpet match before cutting to ensure minimal variation between dye lots.
D. Lay out carpet and locate seams in accordance with shop drawings.
    1. Locate seams in area of least traffic, out of areas of pivoting traffic, and parallel to main traffic.
    2. Do not locate seams perpendicular through door openings.
    3. Align run of pile in same direction as anticipated traffic and in same direction on adjacent pieces.
    4. Locate change of color or pattern between rooms under door centerline.
    5. Provide monolithic color, pattern, and texture match within any one area.
E. Install carpet tight and flat on subfloor, well fastened at edges, with a uniform appearance.

3.04 DIRECT-GLUED CARPET

A. Double cut carpet seams, with accurate pattern match. Make cuts straight, true, and unfrayed. Apply seam adhesive to cut edges of woven carpet immediately.
B. Apply contact adhesive to floor uniformly at rate recommended by manufacturer. After sufficient open time, press carpet into adhesive.
C. Apply seam adhesive to the base of the edge glued down. Lay adjoining piece with seam straight, not overlapped or peaked, and free of gaps.
D. Roll with appropriate roller for complete contact of adhesive to carpet backing.
E. Trim carpet neatly at walls and around interruptions.

3.05 INSTALLATION ON STAIRS

A. Use one piece of carpet for each tread and the riser below. Apply seam adhesive to all cut edges.
B. Install carpet with pile direction in the length of the stair.
C. Adhere carpet tight to stair treads and risers.

3.06 CLEANING

A. Remove excess adhesive from floor and wall surfaces without damage.
B. Clean and vacuum carpet surfaces.

END OF SECTION 09 68 16

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SECTION 09 69 33
LOW-PROFILE FIXED HEIGHT ACCESS FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Fixed height, low-profile access flooring systems.

1.02 RELATED REQUIREMENTS
- A. Section 03 30 00 - Cast-in-Place Concrete: Requirements for floor flatness and levelness.
- B. Section 09 68 13 - Tile Carpeting: Finish for access flooring panels.
- C. Division 26: Electrical raceways.
- D. Division 27: Installation of data cabling equipment.

1.03 REFERENCE STANDARDS
- A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
- B. ASTM E2322 - Standard Test Method for Conducting Transverse and Concentrated Load Tests on Panels used in Floor and Roof Construction 2022.
- C. CISCA (AF) - Recommended Test Procedures for Access Floors 2016.
- D. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
- F. ICC-ES AC151 - Acceptance Criteria for Fixed-Height, Low-Profile, Raised Floor Systems 2007.
- G. ICC-ES AC300 - Acceptance Criteria for Access Floors 2010, with Editorial Revision (2022).
- H. NFPA 75 - Standard for the Fire Protection of Information Technology Equipment 2020.

1.04 ADMINISTRATIVE REQUIREMENTS
- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS
- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data sheets including loading capacities, materials, finishes, dimensions of components, profiles, and accessories.
- C. Shop Drawings: Indicate floor layout, appurtenances or interruptions, edge details, device locations.
- D. Samples: Submit two samples of floor grid and panel, 24 by 12 inch (610 by 610 mm) in size illustrating finish.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention .
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  1. See Section 01 60 00 - Product Requirements, for additional provisions.
  2. Extra Materials: Supply an additional 5 (five) percent of access flooring system components.

1.06 QUALITY ASSURANCE
- A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the type of work required in this section and approved by access flooring manufacturer.

1.07 MOCK-UP

A. Construct access flooring system mock-up, 10 feet (3.048 m) long by 10 feet (3.048 m) wide, showing specified components and accessories.
B. Locate where directed.
C. Mock-up may remain as part of the Work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Access Flooring - Low-Profile Fixed Height:
   1. Netfloor, Inc.; ECO CA500R series low profile access floor systems: www.netfloorusa.com.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

A. General: the low profile access flooring, when installed, structured with self-standing access panels, grid-pattern cable trenches, facilitating easy distribution, extension of electrical, networking and telecommunication cables, and accommodate outlet floor boxes, and cable trench caps to cover and protect cables running in the cable trenches.
B. Comply with the following system requirements and as indicated for specified components.
   1. Test in accordance with CISCA (AF).
   2. Comply with requirements of NFPA 75.
   3. Comply with requirements of ICC-ES AC300.
   4. Comply with requirements of ICC-ES AC151.
   5. Accessibility: Comply with ICC A117.1 and ADA Standards.
   6. Structural Design Live Loads: Comply with requirements of ICC (IBC).
      a. Uniformly Distributed Loads: In compliance with ICC (IBC) Table 1607.1, for access floor systems.
         1) Office Use: 50 pounds per sq ft (2.39 kPa).
         2) Computer Use: 100 pounds per sq ft (4.79 kPa).
      b. Concentrated Loads: Over an area of 2.5 feet by 2.5 feet (762 mm by 762 mm), 2000 pounds (907 kg) minimum, in compliance with ICC (IBC) Table 1607.1, for access floor systems.
   7. Lateral Stability: Design system for lateral stability in all directions, with or without panels in place.
C. Uniform Distribution Load: 500 pounds per square foot (2441 kg/sq m), when tested in accordance with CISCA (AF) and ASTM E2322 on 600 X 600 mm module set.
   1. Maximum Deflection: 0.06 inch (1.52 mm).
D. Concentrated Load: Over an area of 1 inch by 1 inch (25 mm by 25 mm), 400 pounds (181 kg) at any location, when tested in accordance with CISCA (AF).
   1. Maximum Deflection: 0.1 inch (0.25 mm).
E. Uniform Ultimate Load:
   1. 2000 psf undamaged (on 600 x 600 mm module set)
F. Concentrated Ultimate Load: by 1” square indenter
   1. Access panel: greater than 500 psi
   2. Steel Central Cap and Flank Cap: greater than 1300 psi

2.03 ACCESS FLOORING - LOW-PROFILE FIXED HEIGHT

A. Access Flooring – Low-Profile Fixed Height: Factory-fabricated system consisting of fixed height base units forming a grid of cable and wiring trenches that are covered with removable steel floor plates; provide components and accessories required for complete installation and as indicated.
   1. System designed for installation without adhesives or fasteners.
   2. System designed for integration with access flooring manufacturer's modular power distribution system.
   3. Border Components: Manufacturer's standard components to infill gaps between the standard components and edges of field penetrations and boundary walls.

B. Access Flooring System, general:
   1. System height: 1.97 ” (50 mm)
   2. Modular size: 23.62” X 23.62” (600 X 600 mm), consists of 1 access panel (UniPanel), 1 Base Connector, 1 Central Cap, and 4 Flank Caps.
   3. System weight: 2.71 LB per square foot (13.25 kg per sq. meter)

C. Access Panels (UniPanels): self-standing access panel, each panel consists 16 sub-panels, 64 built-in pedestals.
   1. Panel size: 20.08” X 20.08” (510 mm X 510 mm)
   2. Height: fixed height 1.97” (50 mm)
   3. Materials: fire-retard recycled poly-propylene.

D. Cable Trench Caps: to cover the cable trenches
   1. Central Caps: size 5.91” X 5.91” (150 mm X 150 mm), made of 0.09” (2.3 mm) thick steel, 5 mm bend at four sides, reinforced ribs at center, to install, and cover, at intersection of cable trenches, protection against corrosion by electro-deposition.
   2. Flank Caps: size 8.78” X 4.72” (223 mm X 120 mm), reinforced ribs, to install, and cover cable trenches, at sides of access panels. Made of 0.09” (2.3 mm) thick steel, protection against corrosion by electro-deposition.

E. Base Connectors: size 6.65” X 6.65” X 0.59” (169 X 169 X 15 mm), made of recycled poly-carbonate plus ABS.

F. Sound Attenuation Blanket: meet UL94 HB, PE foam, 1 meter width, 0.08” (2 mm) thick, install under access panels to absorb impact sound causing by pedestrians.

G. Cable Trenches configuration: At time of installation, apply Base Connectors to access panels’ corner pedestals. Continuous connection at access panels’ pedestals, automatically forms standard distance 3.54” (90 mm) wide, reticulated cable trenches within every 23.62” (600 mm) distance.

H. Cable Trenches capacity:
   1. Width: 3.54” (90 mm)
   2. Clearance: 1.61” (41 mm)

I. Floor Covering: Field applied.
   1. Carpet Tile: As specified in Section 09 68 13.

2.04 ACCESSORIES - LOW-PROFILE FIXED HEIGHT

A. Exposed Edge and Corner Trim: Manufacturer's standard steel trim; install at locations where underfloor cavity is not enclosed by abutting walls or other construction.

B. Floor boxes: ECO 40 Square 6_8 NFUSA 111016-005
   1. Six (6) power receptacles with provisions for up to (8) data devices.
      a. Electrical Contractor shall have the ability to re-wire the floor box receptacles to accommodate the quantity of circuits shown on the Contract Drawings without

affecting the warranty or UL listing of the floor box.

2. Cover dimensions: 12 x 12 inches.

2.05 FABRICATION

A. Fabrication Tolerances:
   1. Floor Panel Flatness: Plus or minus 0.02 inch (0.5 mm) in any direction.
   2. Floor Panel Width or Length From Specified Size: Plus or minus 0.02 inch (0.5 mm).
   3. Floor Panel Squareness: Plus or minus 0.03 inch (0.8 mm) difference between opposite diagonal dimensions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify field measurements are as indicated on shop drawings.
B. Verify that substrates comply with tolerances, dimensioned clearances, and other requirements specified in other sections, and that substrates are clean, dry, and free of conditions and deleterious substances that might interfere with system installation.
C. Verify that required utilities are available, in proper location, and are ready for use.
D. Start of installation constitutes acceptance of project conditions.

3.02 PREPARATION

A. Vacuum clean substrate surfaces.

3.03 INSTALLATION - LOW-PROFILE FIXED HEIGHT ACCESS FLOORING

A. Install components in accordance with manufacturer's instructions and approved shop drawings.
B. Install undersheet with edges butted, without wrinkles, and contiguous throughout floor system work area.
C. Close field cut floor panels with edge trim.
D. Install system border components to provide a close fit with adjoining construction, with voids between 1/2 to 3/4 inches (13 and 19 mm) where panels abut vertical surfaces.
E. Exposed Edge and Corner Trim: Install at locations indicated on shop drawings and as required by field conditions.
   1. Install edge trim at exposed sides.
F. Control traffic across access flooring during installation to ensure floor capacity is not exceeded.

3.04 TOLERANCES

A. Maximum Out of Level Floor Panel Tolerance: 1/16 inch in 10 ft (1.6 mm in 3 m), non-cumulative.

3.05 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

3.06 ADJUSTING

A. Adjust pedestals to achieve a level floor and to assure adjacent floor panel surfaces are flush.

3.07 PROTECTION

A. Clean access flooring after installation. All residuals shall be removed from the job site.
B. Other trades, such as electrical sub-contractors, when required removing cable trenches' caps for cable routing, shall place the caps at proper and safe location, and shall restore removed cable trenches 100% back onto cable trenches at original position right after completion of each electrical work.

C. Do not permit traffic over unprotected floor surface.
D. Other trades, when working on top of access floors shall make proper and adequate protection. Heavy carts or equipment, when passing through access floors, shall apply continuous plywood panels of minimum 0.47" (12 mm) thick to protect from work of other trades.

END OF SECTION 09 69 33

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SECTION 09 84 00 - ACOUSTIC ROOM COMPONENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabric-covered fiberglass core panels and mounting accessories.
B. Speaker Cloth.

1.02 RELATED REQUIREMENTS

A. Section 061000 - Rough Carpentry
B. Section 062000 - Finish Carpentry
C. Section 099000 - Paints and Coatings

1.03 SUBMITTALS

A. Product Data: Manufacturer's printed data sheets for products specified.
   1. Provide manufacturer's product specifications and installation instructions for acoustical panels and attachment system. Include manufacturer's recommendations for cleaning the fabric on all the acoustical panels, including precautions against materials and methods that may be detrimental to finishes and acoustical performance.
B. Shop Drawings: Fabrication and installation details, panel layout, and fabric orientation. Shop drawings shall indicate at large scale, all locations of acoustical panels. Submit profiles, sizes and reinforcing and anchorage devices, for securing to adjacent materials.
C. Submit certificate of compliance to specified acoustical and fire performance criteria, signed by an officer of the panel manufacturer and attach independent laboratory test results for each product used, showing that the products supplied as components and complete assemblies, meet or exceed the specified requirements.
D. Selection Samples: Manufacturer's color charts for fabric covering, indicating full range of fabrics, colors, and patterns available.
E. Verification Samples: Fabricated samples of each type of panel specified; 24 by 24 inch, showing construction, edge details, and fabric covering, with exposed color and texture and mounting clip and trim to be expected in completed work.
F. Submit samples of all different types of mounting devices, extrusions, etc. for use in this project.
G. Test Reports: Certified test data from an independent test agency verifying that panels meet specified requirements for acoustical and fire performance.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company with not less than 5 years of experience in manufacturing acoustical products similar to those specified.
B. Installation by firm with not less than three years of successful experience in installation of acoustical panels similar to requirements for this project. The installing contractor shall shall have a written document signed by the manufacturer verifying manufacturer's approval of the referenced contractor to install the acoustical products that are the responsibilty of that contractor.
C. Provide acoustical panels which have been tested, rated and labeled by U.L. for indicated ratings as listed in "Classification Building Materials Index" by U.L.

1. Fire Performance Characteristics: Provide acoustic wall panels with surface-burning characteristics as determined by testing panel components in accordance with ASTM E84 test procedures
    a. ASTM E-84 Classification Class "A" or "1"
    b. Flame Spread: 25 or less
    c. Smoke Developed: 450 or less

D. Acoustical Performance Characteristics: Provide acoustic wall panels with acoustical absorption characteristics as indicated in Part 2, which have been determined by testing fully assembled production material in accordance with ASTM C 423 (Type "A" mounting as defined by ASTM E-795) by a testing organization acceptable to authorities having jurisdiction.

E. All fabric finishes specified for acoustic panels shall be tested in accordance with ASTM D6207 - Standard Test Method for Dimensional Stability of Fabrics to Changes in Humidity and Temperature

F. All acoustical wall and ceiling panels of the same type shall be purchased from a single supplier.

1.05 WARRANTY

A. Written guarantee that panels are constructed in accordance with the acoustical laboratory tested product and will be free of defects in material and workmanship for a period of one year after installation.

B. Provide warranty above for a period of five years for acoustic room components.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect acoustical panels from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until panels are needed for installation, cartoned or crated to provide protection during transit and job storage, properly tagged and identified.

B. Inspect acoustical panels upon delivery for damage. Minor damages may be repaired provided refurbished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.

C. Store panels flat, in dry, well-ventilated space; do not stand panels on end. Protect products from damage that may be caused by exposure to water, moisture, chemicals, direct sunlight, or infestation.

D. Protect panel edges from damage. On site storage shall be such as to assure that all panels and associated materials are protected from damage, and storage area is climatically controlled to normal operational levels.

E. Comply with manufacturer’s recommendations.

1.07 PROJECT CONDITIONS

A. Project Environmental Requirements: Prior to unpacking or installing, ensure that the installation area is fully enclosed and protected from moisture and direct sunlight. Ensure that the building’s mechanical systems are fully operational and will not be turned off again even for testing and balancing of the mechanical systems. Coordinate with other trades to ensure that all work above or behind surfaces is complete and that all wet and dusty trades have completed work.

B. Product Acclimatization: If recommended by manufacturer, allow both the installation area and the components to stabilize in temperature and humidity levels that are representative of the

final temperature and humidity levels expected after building completion and occupation following manufacturer's instructions. Do not install products if the humidity exceeds 65%.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fabric-Covered Acoustical Panels:
1. Basis of Design: Conwed: Ladysmith, WI 800-932-2383 www.conwed.com.
2. Golterman & Sabo: www.gsacoustics.com
3. Armstrong World Industries, Inc., Lancaster, PA 717-397-0611: www.armstrong.com
4. Decoustics Limited: www.decoustics.com, P.O. Box 615, Getzville, NY,14068-0615 (800)387-3809
5. Kinetics Noise Control, Interiors Division, Dublin, OH 614-889-0480: www.kineticsnoise.com
6. AVL Systems, Inc., 5540 SW 6th Place, Ocala, FL 34474: www.AVLonline.com
7. Substitutions: See Section 016000 - Product Requirements.

2.02 FABRIC-COVERED ACOUSTICAL PANELS

A. Materials, Glass Fiber Core Panels – Cafeteria & Gymnasium:
1. IR Series, Conwed Design; 2 inch thickness,unless otherwise noted.
2. Glass-fiber board core, 6 to 7 lb/cu. ft. density.
3. Tackable, impact-resistant, high-density face layer: 1/8 inch thick layer molded glass-fiberboard with min. density of 16 to 18 lb/cu. ft.
4. Edges: Beveled.
5. Fabric; Guilford of Maine.

B. Materials, Glass Fiber Core Panels – Auditorium:
1. Respond A Series,Conwed Design; 2 inch thickness,unless otherwise noted.
2. Edges shall be chemically hardened to withstand moderate impact during installation and ongoing maintenance. Chemically hardened edges will be profiled as shown on the architectural drawings.
3. The panel shall be constructed of 6 to 7 lb./cu.ft (96 to 112 kg/cu.m.) density acoustically absorptive core of 1" (25mm), 1 ½" (38mm), 2" (50mm), 3" (75mm), or 4" (100mm) thickness, and finished as detailed in this section, as indicated, and scheduled. Panels shall be tackable.
4. Core shall be free of surface defects and sanded as required to a uniform thickness, which will not vary by more than +/- 0.03" (1.0mm).
5. Panel core dimensions shall be accurate to a tolerance of +/- 0.06" (1.6mm).
6. Fabric finish shall be bonded to or stretch applied over the panel face, bonded to the panel edges and returned a minimum of one inch (25mm) on the back of the panel. The finish shall be flat and wrinkle free and fully tailored at corners with no exposed darting. All finishes shall be tested for suitability (ASTM D6207) and approved for use by the panel manufacturer prior to procurement and fabrication.
7. Acoustical performance: Noise Reduction Coefficient (NRC): Per the below table when tested in accordance with ASTM C423 for Type A mounting, per ASTM E795. Panels shall have noise reduction coefficient values of the following when tested using an acoustically transparent fabric.

Panel			Frequency (Hz)						
Type	Thickness	Finish	125	250	500	1000	2000	4000	NRC
A	1" (25mm)	Fabric	0.03	0.42	0.91	1.08	1.06	0.98	0.85
A	2" (50mm)	Fabric	0.31	0.94	1.12	1.07	1.03	1.00	1.05
A	3" (75mm)	Fabric	0.31	1.13	1.36	1.30	1.24	1.21	1.25

A	4" (100mm)	Fabric	0.46	1.21	1.40	1.31	1.24	1.24	1.30

8. Mounting: Installation shall be either by use of slide and engage clips (“Z”- clips), either into a DWC-7 anti-rattle wall clip or into continuous wall track. Panel clips (DPC-3) and wall clips (DWC-7 or continuous wall track)) shall be a minimum 20 gauge satin-coat steel with wall clips mechanically mounted to the back of the panels. All fasteners (wall anchors, screws, adhesive, etc.) are to be supplied by the installing contractor.
9. Finish: Fabric Covering: Seamless fabric facing material, for stretched covering of core material, selected by Architect.
    a. Patterns: Where fabric with directional or repeating patterns or fabric with directional weave is used, mark for installation in same direction.

2.03 FABRICATION OF FABRIC-COVERED ACOUSTICAL PANELS

A. Fabric Wrapped, General: Fabricate panels to sizes and configurations indicated, with fabric facing installed without sagging, wrinkles, blisters, or visible seams.
    1. For panels suspended from ceiling, provide fabric covering both sides, with seams only at panel edges.
B. Tolerances: Fabricate to finished tolerance of plus or minus 1/16 inch (1.6 mm) for thickness, overall length and width, and squareness from corner to corner.

2.04 ACCESSORIES

A. Fabric Wrapped Acoustical Wall Units:
    1. Back-Mounting Accessories: Manufacturer's standard accessories for concealed support for each panel type, designed to allow panel removal, and as follows:
        a. Two-part clip and base-support bracket or rail system; brackets or rails designed to support full weight of panels and clips designed for lateral support, with one part mechanically attached to back of panel and the other attached to substrate.
        b. If the above is not available for a specific panel, metal impaling clips designed to support full weight of panels, mechanically attached to substrate and adhesively bonded to back of panels.
        c. In all cases mounting systems are to be concealed and approved by manufacturer for proper performance.
B. Diffuser Panels
    1. Manufacturer's standard accessories for concealed support for each panel type, designed to allow panel removal; fixing clips, furring strips, brackets, or rails as standard for manufacturer's concealed mounting systems.
        a. In all cases mounting systems are to be concealed and approved by manufacturer for proper performance.
    2. Ceiling Suspension Accessories: For panels supported from ceiling suspension grids, and accessories required for manufacturer's standard concealed mounting method.
        a. Provide additional galvanized wire of vertical members to support additional weight of panels, as required.
C. Speaker Cloth:
    1. Acoustically transparent speaker cloth: Acoustone grille cloth, Designer/Architect Line ; www.acoustonegrillecloth.com .
    2. Location: Speaker enclosures in Auditorium.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates for conditions detrimental to installation of acoustical panels. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Panels shall be allowed to stabilize on site 24 hours prior to installation.

C. Protection: Protect all floor, wall and ceiling finishes against possible damage prior to commencing installation and during installation.

D. Do not install acoustical panels until space is enclosed and weather-proof, wet-work in space is completed and dry work above ceilings is completed and until ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

E. Coordinate with Other Work: Support all light fixtures, HVAC air inlet/outlet devices, speakers, signage, sprinkler heads/piping, etc. independently from panels. Contractor shall not use panels to support the weight of any other building element or component.

3.02 INSTALLATION

A. General:

1. Installation shall be in accordance with local code requirements, manufacturers instructions, and as shown on approved shop drawings, or detail sheets. Installer shall provide for shimming and adjustments as required to maintain consistent alignment of joints and of finished panel faces, and to ensure unstressed clip and mounting locations.
2. Installation shall be by factory-trained personnel or manufacturer's representatives.

B. Mounting Prefabricated Wood Fiber Acoustical Panels or Diffuser Panels:

1. Panels must only be handled by persons who are equipped as recommended by manufacturer including provisions for wearing clean light-weight gloves.
2. Install acoustical panels in locations indicated, following installation recommendations of panel manufacturer. Align panels accurately, with edges plumb and top edges level. Scribe to fit accurately at adjoining work and penetrations. Finished surfaces are to be mounted on the exposed side.
3. Lay ceiling diffuser panels in ceiling suspension grid specified under Section 09 5100 in accordance with provisions of that Section and and per panel manufacturer's instructions and recommendations.

C. Install panels and diffusers to construction tolerances of plus or minus 1/16 inch (1.6 mm) for the following:

1. Plumb and level.
2. Flatness.
3. Width of joints.

3.03 ADJUSTING

A. Following initial installation, adjust mounting hardware or suspension system so that removable panels can be removed easily, yet stay safely secured upon replacement. Adjust panels so that surfaces are aligned, flush and level or plumb and gaps in between units are of a consistent width and straight.

3.04 CLEANING

A. Clean fabric facing or other surface upon completion of installation from dust and other foreign materials, following manufacturer's instructions.

B. Remove surplus materials, trimmed portions of panels, and debris resulting from installation.

3.05 PROTECTION

A. Provide protection of installed acoustical panels until completion of the work.

B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect.

C. After installation, protect planks against dirt, water, changes in humidity and contact.

3.06 DEMONSTRATION

A. Demonstrate to the building owner or to the owner's representative the safe and proper method for removing and replacing all types of accessible panels.

B. Supply the building owner or the owner's representative with any special tools provided by the manufacturer required to unlatch safety hardware on accessible panels.

END OF SECTION

SECTION 09 91 13
EXTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.
B. Field application of paints.
C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Exposed surfaces of steel lintels and ledge angles.
   2. Exposed structural steel.
   3. Bollards, downspot boots, and miscellaneous metals.
   4. Mechanical and Electrical:
      a. Exposed exterior piping.
D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Stainless steel and prefinished aluminum.
   6. Floors, unless specifically indicated.
   7. Brick, glass unit masonry, architectural concrete, and cast stone.
   8. Exterior insulation and finish system (EIFS).
   9. Glass.
   10. Concrete masonry units in utility and mechanical spaces.
   11. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
B. Section 05 50 00 - Metal Fabrications: Shop-primed items.
C. Section 05 51 00 - Metal Stairs: Shop-primed items.
D. Section 09 91 23 - Interior Painting.

1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.
B. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.
C. SSPC-SP 1 - Solvent Cleaning 2015, with Editorial Revision (2016).
D. SSPC-SP 2 - Hand Tool Cleaning 2018.
E. SSPC-SP 6 - Commercial Blast Cleaning 2007.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").

2. MPI product number (e.g. MPI #47).
3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

C. Samples: Submit one 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.
1. Where sheen is specified, submit samples in only that sheen.

D. Manufacturer's Instructions: Indicate special surface preparation procedures.

E. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, and repair of painted and finished surfaces.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; store where directed.
3. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum five years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience.

1.06 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, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature 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.

1.07 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Minimum Application Temperatures for Latex Paints: 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Provide paints and finishes from the same manufacturer to the greatest extent possible.
1. If a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for

substitutions substitutions.

C. Paints:
   1. Benjamin Moore & Co: www.benjaminmoore.com.
   2. Glidden Professional, a product of PPG Architectural Coatings: www.gliddenprofessional.com.
   3. PPG Paints: www.ppgpaints.com/#sle.
   4. Sherwin-Williams Company: www.sherwin-williams.com/#sle.

D. Primer Sealers: Same manufacturer as top coats.

E. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
   4. Supply each paint material in quantity required to complete entire project's work from a single production run.
   5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content:
   1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
      a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
      b. Ozone Transport Commission (OTC) Model Rule, Architectural, Industrial, and Maintenance Coatings; www.otcair.org; specifically:
         1) Opaque, Flat: 50 g/L, maximum.
         2) Opaque, Nonflat: 150 g/L, maximum.
         3) Opaque, High Gloss: 250 g/L, maximum.
         4) Varnishes: 350 g/L, maximum.
      c. Architectural coatings VOC limits of the State in which the Project is located.
   2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

C. Flammability: Comply with applicable code for surface burning characteristics.

D. Colors: As indicated in Color Schedule.
   1. Extend colors to surface edges; colors may change at any edge as directed by Architect.

2.03 PAINT SYSTEMS - EXTERIOR

A. Provide Premium Grade systems (2 top coats) as defined in MPI Architectural Painting Specification Manual, except as otherwise indicated.

B. SYSTEM E-1:
   1. Substrate: Structural Steel and Metal Fabrications:
   2. Applications include but are not limited to miscellaneous metal boxes, pipes, and downspout boots.
   3. Manufacturers and products:

a. Sherwin Williams:
   1) 1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series
   2) 2nd Coat: S-W A-100 Exterior Latex Gloss, A8 Series
   3) 3rd Coat: S-W A-100 Exterior Latex Gloss, A8 Series
b. Benjamin Moore:
   1) 1st Coat: Super Spec HP Alkyd Metal Primer P06
   2) 2nd Coat: Ultra Spec HP DTM Acrylic Enamel Semi-gloss HP29
   3) 3rd Coat: Ultra Spec HP DTM Acrylic Enamel Semi-gloss HP29
c. Glidden Professional:
   1) 1st Coat: Devoe Coatings DEVFLEX Direct-to-Metal 4020 primer
   2) 2nd Coat: Glidden Professional Fortis 450 6407 topcoat
   3) 3rd Coat: Glidden Professional Fortis 450 6407 topcoat
d. PPG:
   1) 1st Coat: PPG Pitt-Tech Plus Direct to Metal Primer & Flat Finish 4020PF.
   2) 2nd Coat: PPG SPEEDHIDE® Exterior 100% Acrylic Latex Semi-Gloss 6-900XI Series.
   3) 3rd Coat: PPG SPEEDHIDE® Exterior 100% Acrylic Latex Semi-Gloss 6-900XI Series.

C. SYSTEM E-2:
1. Substrate: Hollow metal doors and frames:
2. Finish: Semi-Gloss.
3. Manufacturers and Products:
   a. Sherwin Williams:
      1) 1st Coat: DTM Acrylic Primer/Finish, B66W1
      2) 2nd Coat:DTM Acrylic Gloss Coating, B66W100
      3) 3rd Coat: DTM Acrylic Gloss Coating, B66W100
   b. Benjamin Moore:
      1) 1st Coat: Super Spec HP Alkyd Metal Primer P06
      2) 2nd Coat: Ultra Spec HP DTM Acrylic Enamel Gloss HP28
      3) 3rd Coat: Ultra Spec HP DTM Acrylic Enamel Gloss HP28
   c. PPG:
      1) 1st Coat: PPG Pitt-Tech Plus Direct to Metal Primer & Flat Finish 4020PF.
      2) 2nd Coat: PPG Pitt-Tech Plus EP DTM Acrylic Gloss 90-1510 Series.
      3) 3rd Coat: PPG Pitt-Tech Plus EP DTM Acrylic Gloss 90-1510 Series.

D. SYSTEM E-3:
1. Substrate: Galvanized Metal, Not Chromate Passivated:
2. Applications include but are not limited to railings and piping, lintels, bollards, strructural steel items.
3. Manufacturers and Products:
   a. Sherwin Williams:
      1) 1st Coat:S-W Pro Industrial Pro-Cryl® Primer, B66-1300 Series
      2) 2nd Coat: S-W Sher-Cryl HPA Gloss, B66-300 Series
      3) 3rd Coat: S-W Sher-Cryl HPA Gloss, B66-300 Series
   b. Benjamin Moore:
      1) 1st Coat: Benjamin Moore Ultra Spec HP Acrylic Metal Primer HP04
      2) 2nd Coat: Benjamin Moore Ultra Spec HP DTM Acrylic Enamel Gloss HP28
      3) 3rd Coat: Benjamin Moore Ultra Spec HP DTM Acrylic Enamel Gloss HP28
   c. PPG:
      1) 1) 1st Coat: PPG Pitt-Tech Plus Direct to Metal Primer & Flat Finish 4020PF.
      2) 2nd Coat: PPG SPEEDHIDE® Exterior 100% Acrylic Latex Semi-Gloss 6-900XI Series.

3) 3rd Coat: PPG SPEEDHIDE® Exterior 100% Acrylic Latex Semi-Gloss 6-900XI Series.

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
B. Patching Material: Latex filler.
C. Fastener Head Cover Material: Latex filler.

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 affect proper application.
C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
D. Test shop-applied primer for compatibility with subsequent cover materials.
E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Masonry, Concrete, and Concrete Masonry Units: 12 percent.

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 or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
D. Seal surfaces that might cause bleed through or staining of topcoat.
E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
F. 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.
G. 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. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
   3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 Commercial Blast Cleaning. Protect from corrosion until coated.
H. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

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 and recommendations in "MPI Architectural Painting Specification Manual".

C. Do not apply finishes over dirt, rust, scale, grease, moisture, scuffed surfaces, or other conditions detrimental to formation of a durable coating film; do not apply finishes to surfaces that are not dry.
D. Use applicators and methods best suited for substrate and type of material being applied and according to manufacturer's instructions.
    1. Brush Application: Use brushes best suited for the type of material applied; use brush of appropriate size for the surface or item being painted; produce results free of visible brush marks.
    2. Roller Application: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
    3. Spray Application: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
E. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate; provide total dry film thickness of entire system as recommended by manufacturer.
    1. Number of coats and film thickness required are the same regardless of application method.
    2. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance.
    3. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive dry film thickness equivalent to that of flat surfaces.
F. Apply finish to completely cover surfaces with uniform appearance without brush marks, runs, sags, laps, ropiness, holidays, spotting, cloudiness, or other surface imperfections.
    1. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
    2. Before applying finish coats, apply a prime coat of material recommended by manufacturer, unless the surface has been prime coated by others; where evidence of suction spots or unsealed areas in first coat appear, recoat primed and sealed surfaces to ensure finish coat with no burn through or other defects due to insufficient sealing.
    3. Apply first coat to surface that has been cleaned, pretreated, or otherwise prepared as soon as practical after preparation and before subsequent surface deterioration.
    4. Do not apply succeeding coats until the previous coat has cured as recommended by manufacturer.
    5. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat will not cause the undercoat to lift or lose adhesion.
    6. If manufacturer's instructions recommend sanding to produce a smooth, even surface, sand between coats.
    7. Before applying next coat vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
    8. Pigmented (Opaque) Finishes: Provide smooth, opaque surface of uniform finish, color, appearance, and coverage.
G. Metal Doors to be Painted: Finish metal door top, side, and bottom edge surfaces same as face of door.
H. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
I. Apply each coat to uniform appearance.
J. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.

K. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
L. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finishes until completion of project.
B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION 09 91 13

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SECTION 09 91 23
INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.
B. Field application of paints and stains.
C. Materials for backpriming woodwork.
D. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
   2. Elevator pit ladders.
   3. Prime surfaces to receive wall coverings.
   4. Prime surfaces to be concealed behind permanently installed fixtures, equipment, and furnishings, prior to installation of the permanent item.
   5. Mechanical and Electrical:
      a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
      b. In finished areas, paint shop-primed items.
      c. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
      d. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
E. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne-coated stainless steel, and lead items.
   6. Floors, unless specifically indicated.
   7. Ceramic and other tiles.
   8. Brick, architectural concrete, and cast stone.
   9. Glass.
   10. Acoustical materials, unless specifically indicated.
   11. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
B. Section 05 50 00 - Metal Fabrications: Shop-primed items.
C. Section 05 51 00 - Metal Stairs: Shop-primed items.
D. Section 09 91 13 - Exterior Painting.

1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.

B. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating 2023.
C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials 2020.
D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.
E. SSPC-SP 1 - Solvent Cleaning 2015, with Editorial Revision (2016).
F. SSPC-SP 2 - Hand Tool Cleaning 2018.
G. SSPC-SP 6 - Commercial Blast Cleaning 2007.
H. SSPC-SP 13 - Surface Preparation of Concrete 2018.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").
   2. MPI product number (e.g., MPI #47).
   3. Cross-reference to specified paint system products to be used in project; include description of each system.
C. Samples: Submit one 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.
   1. Where sheen is specified, submit samples in only that sheen.
D. Manufacturer's Instructions: Indicate special surface preparation procedures.
E. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; store where directed.
   3. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum five years documented experience.
B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years documented experience.

1.06 MOCK-UP

A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.
B. Provide sample resident room, illustrating paint colors, textures, and finishes.
C. Locate where directed by Architect.
D. 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, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature 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.

1.08 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
C. Do not apply materials when relative humidity exceeds 85 percent, at temperatures less than 5 degrees F (3 degrees C) above the dew point, or to damp or wet surfaces.
D. Minimum Application Temperatures for Paints: 50 degrees F (10 degrees C) for interiors unless required otherwise by manufacturer's instructions.
E. Provide lighting level of 80 fc (860 lux) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
B. Provide paints and finishes from the same manufacturer to the greatest extent possible.
   1. If a single manufacturer cannot provide specified products; minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.
C. Paints:
   1. Benjamin Moore & Co: www.benjaminmoore.com.
   2. Glidden Professional, a product of PPG Architectural Coatings: www.gliddenprofessional.com.
   3. PPG Paints: www.ppgpaints.com/#sle.
   4. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
D. Primer Sealers: Same manufacturer as top coats.
E. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
   4. Supply each paint material in quantity required to complete entire project's work from a single production run.
   5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
B. Volatile Organic Compound (VOC) Content:
   1. Provide paints and finishes that comply with the most stringent requirements specified in the following:

a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
b. Ozone Transport Commission (OTC) Model Rule, Architectural, Industrial, and Maintenance Coatings; www.otcair.org; specifically:
1) Opaque, Flat: 50 g/L, maximum.
2) Opaque, Nonflat: 150 g/L, maximum.
3) Opaque, High Gloss: 250 g/L, maximum.
4) Varnishes: 350 g/L, maximum.
c. Architectural coatings VOC limits of the State in which the Project is located.
2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

C. Flammability: Comply with applicable code for surface burning characteristics.
D. Colors: As indicated on drawings.
1. Extend colors to surface edges; colors may change at any edge as directed by Architect.
2. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling under which they are mounted.

2.03 PAINT SYSTEMS - INTERIOR

A. Provide Premium Grade systems (2 top coats) as defined in MPI Architectural Painting Specification Manual, except as otherwise indicated.
B. SYSTEM I-1:
1. Substrate: Concrete Masonry Units
2. Applications include, but are not limited to: Concrete Masonry Units in spaces scheduled to be painted.
3. Manufacturers and Products:
a. Sherwin Williams:
1) 1st Coat:S-W PrepRite® Block Filler, B25W25
2) 2nd Coat:S-W ProMar® 200 Latex Semi-Gloss, B20W2200 Series
3) 3rd Coat:S-W ProMar® 200 Latex Semi-Gloss, B20W2200 Series
b. Benjamin Moore:
1) 1st Coat: Ultra Spec Masonry Interior/Exterior Hi-Build Block Filler 571
2) 2nd Coat: Ultra Spec 500 Interior Latex Semi-Gloss T546
3) 3rd Coat: Ultra Spec 500 Interior Latex Semi-Gloss T546
c. Glidden Professional:
1) 1st Coat:Glidden Professional Block Filler 3010 primer
2) 2nd Coat:Glidden Professional Diamond 450 7400 topcoat
3) 3rd Coat:Glidden Professional Diamond 450 7400 topcoat.
d. PPG:
1) 1st Coat: PPG Speedhide Int./Ext. Masonry Hi Fill Latex Block Filler 6-15XI.
2) 2nd Coat: PPG Speedhide Zero Interior Latex Paint Semi-Gloss 6-5510 Series.
3) 3rd Coat: PPG Speedhide Zero Interior Latex Paint Semi-Gloss 6-5510 Series.

C. SYSTEM I-2
1. Substrate: Concrete Masonry Units (Epoxy paint, Semi-gloss finish)
2. Applications include, but are not limited to: Concrete Masonry Units in spaces scheduled to receive epoxy paint.
3. Manufacturers and Products:
a. Sherwin Williams:
1) 1st Coat:S-W Heavy Duty Block Filler, B42W46
2) 2nd Coat:S-W Pro Industrial Waterbased Catalyzed Epoxy, B73-300 Series
3) 3rd Coat:S-W Pro Industrial Waterbased Catalyzed Epoxy, B73-300 Series

b. Benjamin Moore:
   1) 1st Coat: Corotech Waterborne Epoxy Block Filler V163
   2) 2nd Coat: Corotech Waterborne Amine Epoxy V440
   3) 3rd Coat: Corotech Waterborne Amine Epoxy V440
c. Glidden Professional:
   1) 1st Coat:Tru-Glaze 4015 Block Filler
   2) 2nd Coat:Tru-Glaze WB 4426 Water-Based Epoxy
   3) 3rd Coat:Tru-Glaze WB 4426 Water-Based Epoxy
d. PPG:
   1) 1st Coat: PPG Speedhide Int./Ext. Masonry Hi Fill Latex Block Filler 6-15XI.
   2) 2nd Coat: PPG Aquapon WB EP Water-Based Epoxy 98E-1 Series.
   3) 3rd Coat: PPG Aquapon WB EP Water-Based Epoxy 98E-1 Series.

D. SYSTEM I-3: Not Used.

E. SYSTEM I-4
1. Substrate: Structural Steel and Metal Fabrications:
2. Applications include, but are not limited to: steel and metal fabrications, piping, hollow metal doors and frames in spaces scheduled to be painted.
3. Finish: Semi Gloss.
4. Manufacturers and Products:
   a. Sherwin Williams:
      1) 1st Coat: DTM Acrylic Primer/Finish, B66W1
      2) 2nd Coat: S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series.
      3) 3rd Coat: S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series.
   b. Benjamin Moore:
      1) 1st Coat: Ultra Spec HP Acrylic Metal Primer HP04
      2) 2nd Coat: Ultra Spec HP DTM Acrylic Enamel Semi-gloss HP29
      3) 3rd Coat: Ultra Spec HP DTM Acrylic Enamel Semi-gloss HP29
   c. PPG:
      1) 1st Coat: PPG Pitt-Tech Plus Direct to Metal Primer & Flat Finish 4020PF.
      2) 2nd Coat: PPG Pitt-Tech Plus EP DTM Acrylic Semi-Gloss 90-1610 Series.
      3) 3rd Coat: PPG Pitt-Tech Plus EP DTM Acrylic Semi-Gloss 90-1610 Series.

F. SYSTEM I-5
1. Substrate: Galvanized Metal, Not Chromate Passivated:
2. Applications include, but are not limited to, galvanized metal fabrications, ductwork, conduit, and decking, in spaces scheduled to be painted.
3. Manufacturers and Products:
   a. Sherwin WIlliams:
      1) 1st Coat:S-W Pro Industrial Pro-Cryl® Primer, B66-310 Series
      2) 2nd Coat: S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series.
      3) 2nd Coat: S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series.
   b. Benjamin Moore:
      1) 1st Coat: Moore Ultra Spec HP Acrylic Metal Primer HP04
      2) 2nd Coat: Ultra Spec HP DTM Acrylic Enamel Semi-gloss HP29
      3) 3rd Coat: Ultra Spec HP DTM Acrylic Enamel Semi-gloss HP29
   c. PPG:
      1) 1st Coat: PPG Pitt-Tech Plus Direct to Metal Primer & Flat Finish 4020PF.
      2) 2nd Coat: PPG Speedhide Zero Interior Latex Paint Semi-Gloss 6-5510 Series.
      3) 3rd Coat: PPG Speedhide Zero Interior Latex Paint Semi-Gloss 6-5510 Series.

G. SYSTEM I-6
1. Substrate: Woodwork (Opaque Semi-Gloss Finish)

2. Applications include, but are not limited to, finish carpentry items indicated to receive an opaque finish.
3. Manufacturers and Products:
   a. Sherwin Williams:
      1) 1st Coat: S-W Premium Wall & Wood Primer, B28W8111
      2) 2nd Coat: S-W Pro Industrial Acrylic, B66-650 Series
      3) 3rd Coat: S-W Pro Industrial Acrylic, B66-650 Series
   b. Benjamin Moore:
      1) 1st Coat: Moore Ultra Spec 500 Interior Latex Primer N534
      2) 2nd Coat: Ultra Spec 500 Interior Latex Semi-Gloss T546
      3) 3rd Coat: Ultra Spec 500 Interior Latex Semi-Gloss T546
   c. Glidden Professional:
      1) 1st Coat: Glidden Professional High Hide 1000 primer
      2) 2nd Coat:Glidden Professional Diamond 450 7400 topcoat
      3) 3rd Coat:Glidden Professional Diamond 450 7400 topcoat
   d. PPG:
      1) 1st Coat: PPG Seal Grip Interior Primer/Finish 17-951.
      2) 2nd Coat: PPG Speedhide Zero Interior Latex Paint Semi-Gloss 6-5510 Series.
      3) 3rd Coat: PPG Speedhide Zero Interior Latex Paint Semi-Gloss 6-5510 Series.

H. SYSTEM I-7: Not Used.

I. SYSTEM I-8: Not Used.

J. SYSTEM I-9: Not Used.

K. SYSTEM I-10
1. Substrate: Gypsum Board (Satin Finish):
2. Applications include but are not limited to walls, ceilings, soffits, and bulkheads, in spaces scheduled to be painted.
3. Manufacturers and Products:
   a. Sherwin Williams:
      1) 1st Coat:S-W PrepRite 200 Int. Latex Primer, B28 Series
      2) 2nd Coat:S-W ProMar® 200 Latex Eggshell, B20 Series
      3) 3rd Coat:S-W ProMar® 200 Latex Eggshell, B20 Series
   b. Benjamin Moore:
      1) 1st Coat: Ultra Spec 500 Interior Latex Primer N534
      2) 2nd Coat: Ultra Spec 500 Interior Latex Eggshell T538
      3) 3rd Coat: Ultra Spec 500 Interior Latex Eggshell T538
   c. Glidden Professional:
      1) 1st Coat: Glidden Professional High Hide 1000 primer
      2) 2nd Coat:Glidden Professional Diamond 450 7300 topcoat
      3) 3rd Coat:Glidden Professional Diamond 450 7300 topcoat
   d. PPG:
      1) 1st Coat: PPG Speedhide zero Interior Zero-VOC Latex Sealer 6-4900XI.
      2) 2nd Coat: PPG Speedhide Zero Interior Latex Paint Eggshell 6-5310 Series.
      3) 3rd Coat: PPG Speedhide Zero Interior Latex Paint Eggshell 6-5310 Series.

L. SYSTEM I-11
1. Substrate: Gypsum Board (Epoxy Finish):
2. Applications include but are not limited to walls, ceilings, soffits, and bulkheads, in spaces scheduled to receive an epoxy paint finish.
3. Manufacturers and Products:
   a. Sherwin Williams:
      1) 1st Coat: PrepRite 200 Int Latex Primer
      2) 2nd Coat: ProIndustrial Precat. WB Epoxy, S-G, Series K46

3) 3rd Coat: ProIndustrial Precat. WB Epoxy, S-G, Series K46
b. Benjamin Moore:
1) 1st Coat: Ultra Spec 500 Interior Latex Primer N534
2) 2nd Coat: Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342
3) 3rd Coat: Corotech Pre-Catalyzed Waterborne Epoxy Eggshell V342
c. Glidden Professional:
1) 1st Coat: Glidden Professional High Hide 1000 primer
2) 2nd Coat: Devoe Coatings TRU-GLAZE WB Epoxy 4426 topcoat
3) 3rd Coat: Devoe Coatings TRU-GLAZE WB Epoxy 4426 topcoat
d. PPG:
1) 1st Coat: PPG Speedhide zero Interior Zero-VOC Latex Sealer 6-4900XI.
2) 2nd Coat: PPG PITT-GLAZE WB1 Interior Eggshell Pre-Catalyzed Water-Borne Acrylic Epoxy 16-1310.
3) 3rd Coat: PPG PITT-GLAZE WB1 Interior Eggshell Pre-Catalyzed Water-Borne Acrylic Epoxy 16-1310.

M. SYSTEM I-12
1. Substrate: Concrete Floor (Sealed):
2. Manufacturers and Products:
a. W. R. Meadows:
1) 1st Coat:VOCCOMP-30 Concrete Curing and Sealing Compound
b. PPG:
1) 1st Coat: Perma-Crete Plex-Seal WB Interior/Exterior Clear Sealer 4-6200XI.

N. SYSTEM I-13
1. Chroma Key Finish
2. Manufacturer and product:
a. Rosco Laboratories Inc., 52 Harbor View, Stamford, CT, USA, 06902
1) 1st Coat: Rosco Tough Prime
2) 2nd Coat: #05711 Chroma Key Green
3) 3rd Coat: #05711 Chroma Key Green
b. Over new gypsum board, apply preliminary coat of primer, then 1st Coat noted above.
1) Preliminary Coat: S-W PrepRite 200 Int. Latex Primer, B28 Series

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
B. Patching Material: Latex filler.
C. Fastener Head Cover Material: Latex filler.

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 affect proper application.
C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
D. Test shop-applied primer for compatibility with subsequent cover materials.
E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:

1. Gypsum Wallboard: 12 percent.
2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
4. Concrete Floors and Traffic Surfaces: 8 percent.

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 or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
D. Seal surfaces that might cause bleed through or staining of topcoat.
E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
F. Concrete:
   1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
   2. Clean concrete according to ASTM D4258. Allow to dry.
   3. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.
G. Masonry:
   1. Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
   2. Prepare surface as recommended by top coat manufacturer.
H. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
I. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
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. Clean surfaces with solvent. Prime bare steel surfaces.
   3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 Commercial Blast Cleaning. Protect from corrosion until coated.
L. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
M. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

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 and recommendations in "MPI Architectural Painting Specification Manual".

C. Do not apply finishes over dirt, rust, scale, grease, moisture, scuffed surfaces, or other conditions detrimental to formation of a durable coating film; do not apply finishes to surfaces that are not dry.
D. Use applicators and methods best suited for substrate and type of material being applied and according to manufacturer's instructions.
    1. Brush Application: Use brushes best suited for the type of material applied; use brush of appropriate size for the surface or item being painted; produce results free of visible brush marks.
    2. Roller Application: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
    3. Spray Application: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
E. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate; provide total dry film thickness of entire system as recommended by manufacturer.
    1. Number of coats and film thickness required are the same regardless of application method.
    2. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance.
    3. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive dry film thickness equivalent to that of flat surfaces.
F. Apply finish to completely cover surfaces with uniform appearance without brush marks, runs, sags, laps, ropiness, holidays, spotting, cloudiness, or other surface imperfections.
    1. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
    2. Before applying finish coats, apply a prime coat of material recommended by manufacturer, unless the surface has been prime coated by others; where evidence of suction spots or unsealed areas in first coat appear, recoat primed and sealed surfaces to ensure finish coat with no burn through or other defects due to insufficient sealing.
    3. Apply first coat to surface that has been cleaned, pretreated, or otherwise prepared as soon as practical after preparation and before subsequent surface deterioration.
    4. Do not apply succeeding coats until the previous coat has cured as recommended by manufacturer.
    5. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat will not cause the undercoat to lift or lose adhesion.
    6. If manufacturer's instructions recommend sanding to produce a smooth, even surface, sand between coats.
    7. Before applying next coat vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
    8. Pigmented (Opaque) Finishes: Provide smooth, opaque surface of uniform finish, color, appearance, and coverage.
G. Metal Doors to be Painted: Finish metal door top, side, and bottom edge surfaces same as face of door.
H. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
I. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
J. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

K. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
L. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
M. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finishes until completion of project.
B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION 09 91 23

SECTION 10 11 01 - VISUAL DISPLAY BOARDS AND DISPLAY CASES

PART 1 - GENERAL

1.01 SECTION INCLUDES
- A. Markerboards
- B. Tackboards
- C. Tackstrips
- D. Display Cases.

1.02 RELATED REQUIREMENTS
- A. Section 06 10 00 - Rough Carpentry: Blocking and supports.

1.03 REFERENCE STANDARDS
- A. ANSI A135.4 - Basic Hardboard 2012 (R2020).
- B. ANSI A208.1 - American National Standard for Particleboard 2016.
- C. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling 2009a.

1.04 SUBMITTALS
- A. Product Data: Provide manufacturer's data on markerboard, tackboard, tackboard surface covering, trim, and accessories.
- B. Shop Drawings: Indicate wall elevations, dimensions, joint locations , special anchor details.
- C. Samples: Submit color charts for selection of color and texture of markerboard, tackboard, tackboard surface covering, and trim.
- D. Test Reports: Show conformance to specified surface burning characteristics requirements.
- E. Manufacturer's printed installation instructions.

1.05 QUALITY ASSURANCE
- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 WARRANTY
- A. Provide five year warranty for markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

PART 2 PRODUCTS

2.01 MANUFACTURERS
- A. Visual Display Boards:
  1. Claridge Products and Equipment, Inc: www.claridgeproducts.com.
  2. Nelson Adams NACO : www.nelsonadamsnaco.com/
  3. Polyvision Corporation; Product Polyvision 500 Series P3 ceramicsteel boards: is the Basis of Design: www.polyvision.com.
     - a. Fabricators shall be limited to those approved by manufacturer.
     - b. Approved manufacturer/fabricator: ABC School Equipment/Platinum Visual Systems
  4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 VISUAL DISPLAY BOARDS

A. Markerboards: Porcelain enamel on steel, laminated to core.
   1. Color: As selected from manufacturer's full range.
   2. Steel Face Sheet Thickness: 24 gage, 0.0239 inch .
   3. Core: Particleboard, 1/2 inch thick, laminated to face sheet.
   4. Backing: Aluminum foil, laminated to core.
   5. Size: As indicated on drawings.
   6. Frame: Extruded aluminum , with concealed fasteners.
   7. Frame Profile: Box chalktray with end closures; 1 1/2" perimeter trim
   8. Frame Finish: Anodized, natural.
   9. Accessories: Provide chalk tray and map rail with 2" tack strip, hanging devices for audio-visual aids, flag holders.

B. Tackboards: Composition cork.
   1. Cork Thickness: 1/4 inch.
   2. Color: As selected from manufacturer's full range.
   3. Backing: Hardboard, 1/4 inch thick, laminated to tack surface.
   4. Size: As indicated on drawings.
   5. Frame: Same type and finish as for markerboard.
   6. Frame Profile: 1 1/2" perimeter trim.
   7. Frame Finish: Anodized, natural.

C. Combination Units and Units Made of More Than One Panel: Factory-assembled markerboards and tackboards in a single frame, of materials specified above.
   1. Join panels of different construction with H-shaped extruded aluminum molding finished to match frame.
   2. Join panels of similar construction with butt joints, aligned and secured with steel spline concealed in edge of core.
   3. Configuration: As indicated on drawings.
   4. Units Too Large to Ship Assembled: Fully assembled in factory, then disassembled for shipping.

D. Tack Strips
   1. Product: Polyvision 2" Aluminum Display Rail with composition cork.
   2. Color: As selected from manufacturer's standard colors.
   3. Quantity: Total allowance 1,275 linear feet.
   4. Locations
      a. Provide as indicated, holding ends 12 inches away from corners and door frames.
         1) Corridor 100A
            (a) Classroom side of corridor only.
            (b) Two rows mounted at 5’-0” AFF and 6’-0” AFF.
         2) Corridor 100C
            (a) Classroom side of corridor only.
            (b) Two rows mounted at 5’-0” AFF and 6’-0” AFF.
         3) Corridor 100E
            (a) Both sides of corridor not including alcoves with displays.
            (b) Two rows mounted at 5’-0” AFF and 6’-0” AFF.
         4) Corridor 200A
            (a) Classroom side of corridor only.
            (b) One row mounted at 6’-0” AFF.
         5) Corridor 200B
            (a) Classroom side of corridor only.

(b) One row mounted at 6’-0” AFF.

6) Corridor 200D
   (a) Both sides of corridor.
   (b) One row mounted at 6’-0” AFF.

2.03 MATERIALS

A. Porcelain Enameled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on vitreous finish.
B. Hardboard for Chalk Surface: ANSI A135.4 Tempered type.
C. Particleboard: ANSI A208.1; wood chips, set with waterproof resin binder, sanded faces.
D. Foil Backing: Aluminum foil sheet, 0.005 inch thick.
E. Adhesives: Type used by manufacturer.

2.04 DISPLAY CASES - RECESSED

A. Display Cases: Claridge 370 Series, size and location as indicated in drawings.
   1. Equivalent products of Polyvision are also acceptable.
B. Back: Plywood with takable fabric wrapped surface.
   1. Fabric: Guilford of Maine FR701, ASTM E 84 Class A.
C. Top, Sides, and Bottom : Veneer Core Plywood: ¾" thick 7 ply white maple veneer core plywood, Grade A, transparent factory finish.
D. Shelf Standards: 5/8-inch by 7/16-inch steel with anachrome finish and slots in 1-inch increments.
E. Glass (shelving and doors): ASTM C 1048, FT (fully tempered), Type I.
   1. Thickness: 6 mm (1/4 inch nominal).
   2. Color: Clear.
F. Glass shelving: provide 3 rows per case.
G. Aluminum Perimeter Trim: 6063-T5 alloy, 3-1/2” aluminum trim, mitered, with reinforced corners and mechanical fasteners
   1. Finish: Powder-coated, color as selected by architect from standard RAL colors.
H. Sliding Door Locks: chrome plated, one per set of doors.
I. Lights: LED lighting - see Electrical.

2.05 ACCESSORIES

A. Map Rail: Extruded aluminum, manufacturer's standard profile, with cork insert and runners for accessories; 2 inch wide , full width of frame.
B. Map Supports: Formed aluminum sliding hooks and roller brackets to fit map rail. Provide (2) per board.
C. Flag Holders: For 2" map rail, with rail clamp. Inside diameter of flag tube: 1/2". Provide (1) per board.
D. Temporary Protective Cover: Sheet polyethylene, 8 mil thick.
E. Cleaning Instruction Plate: Provide instructions for chalkboard cleaning on a metal plate fastened to perimeter frame near chalkrail.
F. Chalk Tray: Aluminum, manufacturer's standard profile, one piece full length of chalkboard, molded ends, concealed fasteners, same finish as frame.
G. Mounting Brackets: Concealed.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.
B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.
C. Verify flat wall surface for frameless adhesive-applied boards.

3.02 INSTALLATION

A. Install display boards and cases in accordance with manufacturer's instructions.
    1. Install display boards with top of chalk tray at 32 inches above finished floor unless otherwise noted.
    2. Coordinate display case installation with display case lighting requirements. See electrical drawings.
B. Secure units level and plumb.
C. Butt Joints: Install with tight hairline joints.

3.03 CLEANING

A. Clean board surfaces in accordance with manufacturer's instructions.
B. Cover with protective cover, taped to frame.
C. Remove temporary protective cover at Date of Substantial Completion.

END OF SECTION

SECTION 10 21 13.19 - PLASTIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Solid plastic toilet compartments.
- B. Urinal screens.

1.02 RELATED REQUIREMENTS
- A. Section 06 10 00 - Rough Carpentry: Blocking and supports.
- B. Section 10 28 00 - Toilet Accessories.

1.03 REFERENCE STANDARDS
- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- B. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth 2019.

1.04 ADMINISTRATIVE REQUIREMENTS
- A. Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

1.05 SUBMITTALS
- A. See Section 01 30 00 - 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 and floor supports, door swings.
- D. Samples:
  - Submit manufacturers color selection sheet for initial color selection. Architect may select up to 3. Pdf or electronic copies are not acceptable.
  - Submit min, 4”X4” physical samples of each initially selected color and pattern
  - Submit 12”X12” sample of final selection for approval

1.06 QUALITY ASSURANCE
- A. Manufacturer Qualifications: A company regularly engaged in manufacture of products specified in this section, and whose products have been in satisfactory use under similar service conditions for not less than 5 years.
- B. Installer Qualifications: A company regularly engaged in installation of products specified in this Section, with a minimum of 5 years experience.

PART 2 PRODUCTS

2.01 PLASTIC TOILET COMPARTMENTS
- A. Basis of Design: Scranton Products “Hiny Hider”. Subject to meeting the basis of design specifications and the Design intent Acceptable manufacturers are
  1. ASI Global partitins
  2. Bradley Corporation
  3. Substitutions: Section 01 60 00 - Product Requirements.

- B. Solid Plastic Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE); floor-mounted headrail-braced; tested and

passed in accordance with NFPA 286.

1. Color and Finish: as selected from manufacturer's full range.
2. Doors:
   a. Thickness: 1 inch.
   b. Width: Min 24".
   c. Width for Handicapped Use: 36 inch, out-swinging.
   d. Height: 66 inch.
3. Panels:
   a. Thickness: 1 inch.
   b. Height: 66 inch.
4. Pilasters:
   a. Thickness: 1 inch.
   b. Width: As required to fit space; minimum 3 inch.
5. Urinal Screens: To match compartments; mounted to wall with continuous panel brackets.
   a. Thickness: 1 inch.
   b. Depth: 18 inches.
   c. Height: 55 inch.

2.02 ACCESSORIES

A. Pilaster Shoes: Stainless steel, satin finish, 3 inches high; concealing floor fastenings.
   1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
B. Head Rails: Extruded aluminum, anti-grip profile.
C. Wall and Pilaster Brackets: Stainless steel; continuous type.
   1. Urinal screen wall brackets: Continuous, extruded aluminum.
D. Attachments, Screws, and Bolts: Stainless steel , tamper proof type.
   1. For attaching panels and pilasters to brackets: stainless steel tamper resistant torx head sex bolts.
E. Hinges: Stainless steel; satin finish.
   1. Continuous-type hinge at all locations, self closing at accessible compartments.
F. Door Hardware: Stainless steel; polished finish, unless otherwise noted.
   1. Door Latch: Slide type with exterior emergency access feature.
   2. Door Strike and Keeper with Rubber Bumper: Mount on pilaster in alignment with door latch. Provide extruded aluminum strikes, full height of door panel.
   3. Provide door pull for outswinging doors.
   4. Provide additional door pull at interior of outswinging doors of accessible stalls.
   5. Coat Hook with Rubber Bumper: One per compartment, mounted on door.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.
B. Verify correct spacing of and between plumbing fixtures.
C. Verify correct location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
B. Maintain 3/8 inch to 1/2 inch 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 head rail joints at pilaster center lines.

E. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.03 TOLERANCES

A. Maximum Variation From True Position: 1/4 inch.
B. Maximum Variation From Plumb: 1/8 inch.

3.04 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
B. Adjust adjacent components for consistency of line or plane.

END OF SECTION

SECTION 10 21 23 - CUBICLE CURTAINS

PART 1 - GENERAL

1.01 SECTION INCLUDES
- A. The fabrication, furnishing, delivery, and installation of cubicle curtains.
- B. The work of this section shall include, but not necessarily be limited to the following:
  1. Cubicle curtains in Nurse area.

1.02 GENERAL REQUIREMENTS
- A. Field Conditions: All bidders shall fully inform themselves of the conditions under which the work is to be performed. No additional compensation shall be allowed for any labor or item the bidder could have been fully informed of prior to the bid date

1.03 QUALITY ASSURANCE
- A. Installer Qualifications: An experienced installer who has completed installation of curtains similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Fire-Test-Response Characteristics: Provide curtains with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or a testing and inspecting agency acceptable to authorities having jurisdiction. Permanently attach label to each fabric of curtain assembly indicating whether fabric is inherently and permanently flame resistant, or treated with flame-retardant chemicals, and whether it will require retreatment after designated time period or cleaning.
  1. Flame resistance ratings : passes NFPA 701
- C. Cubicle curtains: Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.

1.04 SUBMISSIONS
- A. Drawings: Submit component and installation drawings and schedules showing all information necessary to fully explain the features, appearance, function, fabrication and installation.
- B. Curtain Samples for Initial Selection: Manufacturer's color charts showing the full range of colors, textures, and patterns available, together with 12-inch- square sample (any color) of each type fabric.
- C. Product Certificates: Signed by manufacturers of curtains certifying that products furnished comply with requirements. Give name of flame-retardant chemical used, identification of applicator, treatment method, application date, allowable life span for treatment, and details of any restrictions and limitations.
  1. Schedule: Prior to the commencement of the installation work, the Contractor shall submit an outline of the proposed schedule and requirements for approval.

1.05 PROJECT CONDITIONS
- A. Field Measurements: Verify curtain openings and dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work

PART 2 - PRODUCTS

2.01 CUBICLE CURTAINS AND TRACK.

A. Approved manufacturers: Maharam; Interspec; Architex; Carnegie

B. Curtains Type-PC-1:

1. Fabric: 100% flame retardant polyester.
2. Width: Equal to respective track length, plus minimum 20% fullness.
3. Length: equal to floor to ceiling length, with 20 “heading mesh, minus 10” (above floor)
4. Mesh shall be serged to face fabric, turned and stitched with double needle lock stitch no less than 1/2" in width.
5. Bottom and side hems: Fabric is double folded 1 1/2” and sewn with double needle lock stitch.
6. Vertical Seams: Seams are serged together and sewn with double needle lock stitch minimum ½” wide.
7. Heading mesh: Provide 20” mesh, no snag, tightly woven selvedge, minimum 70% open, ½” diagonal; with 1.25 “ grommet band at top edge. Color : Beige.
8. Curtain grommets: #2 two rolled-edge, rust proof, nickel plated brass, spaced no more than 6” o/c. and machined into top header.
9. Track:
   a. Extruded Aluminum track : 1 3/8” wide x ¾” high.
   b. Curve track: factory fabricated as required.
   c. Finish: white, baked enamel.
10. Track accessories.
    a. Provide all required accessories to match track. End stops - removable.
    b. Fasteners: stainless steel.
11. Curtain carriers.
    a. Two nylon rollers, nylon axle, and tangle free nylon swivel stem with chrome plated steel hook.

PART 3 - EXECUTION

3.01 INSTALLATION – CUBICLE CURTAINS

A. Install tracks level and plumb per manufacture’s instructions.

B. Type: surface mounted on ceiling grid.

C. Provide adequate carriers for installation, plus 10% extra as attic stock.

3.02 LOCATION

A. Nurse Area.

3.03 CLEAN UP

A. The Contractor shall be responsible for clean up, including removal of packing materials etc. and the protection of surfaces or equipment provided by other contractors.

1. Manuals and instruction in the care and maintenance of curtains shall be provided in accordance with Part 1 of this Specification.

END OF SECTION

SECTION 10 21 23
CUBICLE CURTAINS AND TRACK

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Surface mounted overhead curtain track and guides.
- B. Cubicle curtains.

1.02 RELATED REQUIREMENTS
- A. Section 06 10 00 - Rough Carpentry: Blocking and supports for track.
- B. Section 09 51 00 - Acoustical Ceilings: Suspended ceiling system to support track.

1.03 REFERENCE STANDARDS
- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023c.
- B. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films 2023, with Errata.

1.04 SUBMITTALS
- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for curtain fabric characteristics and track components.
  1. Product Certificates: Signed by manufacturers of curtains certifying that products furnished comply with requirements. Give name of flame-retardant chemical used, identification of applicator, treatment method, application date, allowable life span for treatment, and details of any restrictions and limitations.
- C. Shop Drawings: Indicate a reflected ceiling plan view of curtain track, hangers and suspension points, attachment details, schedule of curtain sizes.
- D. Curtain Samples for Initial Selection: Manufacturer's color charts showing the full range of colors, textures, and patterns available, together with 12-inch- square sample (any color) of each type fabric.
- E. Samples: Submit 12 by 12 inch (300 by 300 mm) sample patch of curtain cloth with representative top, bottom, and edge hem stitch detail, heading with reinforcement and carrier attachment to curtain header.
- F. Samples: Submit 12 inch (300 mm) sample length of curtain track including typical splice, wall and ceiling hanger, and escutcheon.
- G. Maintenance Data: Include recommended cleaning methods and materials and stain removal methods.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  1. See Section 01 60 00 - Product Requirements, for additional provisions.
  2. Extra Curtains: Two of each type and size.
  3. Extra Carriers: Ten.

1.05 QUALITY ASSURANCE
- A. Installer Qualifications: An experienced installer who has completed installation of curtains similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Fire-Test-Response Characteristics: Provide curtains with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated, by UL or a testing and inspecting agency acceptable to authorities having jurisdiction. Permanently attach

label to each fabric of curtain assembly indicating whether fabric is inherently and permanently flame resistant, or treated with flame-retardant chemicals, and whether it will require retreatment after designated time period or cleaning.

1.06 PROJECT CONDITIONS

A. Field Measurements: Verify curtain openings and dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Accept curtain materials on site and inspect for damage.
B. Store curtain materials on site and deliver to Owner for installation when requested.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Cubicle Track Systems:
   1. A. R. Nelson Co: www.arnelson.com/#sle.
   2. Construction Specialties, Inc: www.c-sgroup.com/#sle.
   3. Inpro: www.inprocorp.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.
B. Cubicle Curtains:
   1. Basis of Design: Architex; Carnegie
   2. Maharam; Interspec.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 TRACKS AND TRACK COMPONENTS

A. Tracks: Extruded aluminum sections; one piece per track run.
   1. Profile: Channel.
   2. Mounting: Surface.
   3. Structural Performance: Capable of supporting vertical test load of 50 lbs (23 kg) without visible deflection of track or damage to supports, safely supporting moving loads, and sufficiently rigid to resist visible deflection and without permanent set.
   4. Track End Stop: To fit track section.
   5. Track Bends: Minimum 12 inch (300 mm) radius; fabricated without deformation of track section or impeding movement of carriers.
   6. Finish on Exposed Surfaces: White enamel.
B. Curtain Carriers: Nylon rollers, size and type compatible with track; designed to eliminate bind when curtain is pulled; fitted to curtain to prevent accidental curtain removal.
C. Installation Accessories: Types required for specified mounting method and substrate conditions.

2.03 CURTAINS

A. Cubicle Curtains:
   1. Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
   2. Inherently flame resistant or flameproofed; capable of passing NFPA 701 test.
   3. Cubicle curtains: Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.
   4. Material: Close weave polyester; anti-bacterial, self deodorizing, sanitized, and preshrunk.
   5. Open Mesh Cloth: Open weave to permit air circulation; flameproof material, manufacturer's standard color.

6. Products:
    a. Maharam: Increment.
    b. Architex: Carnegie .
    c. Substitutions: See Section 01 60 00 - Product Requirements.

B. Curtain Fabrication:
1. Width of curtain to be 20 percent wider than track length.
2. Length of curtain to end 10 inches (254 mm) above finished floor.
3. Pattern match fabric with vertical seams.
    a. Vertical Seams: Seams are serged together and sewn with double needle lock stitch minimum ½” wide.
4. Include open mesh cloth at top 20 inches (508 mm) of curtain for room air circulation.
    a. Mesh shall be serged to face fabric, turned and stitched with double needle lock stitch no less than 1/2" in width.
5. Bottom and side hems: Fabric is double folded 1 1/2” and sewn with double needle lock stitch.
6. Curtain Heading: Fabric band matching curtain panel with metal grommet holes for carriers spaced 6 inches (150 mm) on center.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and supports above ceiling are ready to receive work of this Section.
B. Verify that field measurements are as indicated on shop drawings.

3.02 INSTALLATION

A. Install curtain track to be secure, rigid, and true to ceiling line.
B. See Section 06 10 00 for track supports above ceiling.
C. Secure track to ceiling system.
D. Install end cap and stop device.
E. Install curtains on carriers ensuring smooth operation.

END OF SECTION 10 21 23

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SECTION 10 22 39 - VERTICALLY RETRACTABLE WALLS

PART 1 - GENERAL

1.01 SUMMARY

A. Supply and installation of vertically retractable walls as shown on the architectural drawings. All necessary hardware, seals, lifting machinery, and electrical controls are included.

1.02 RELATED SECTIONS

A. Section 05 12 00, Structural Steel Framing: Main support steel beam for the wall; miscellaneous support steel for the lifting machinery.

B. Section 09 21 16, Gypsum Board Assemblies: Ceiling storage pockets, bulkheads, and sound insulation above, below, and in fixed walls at both ends of retractable wall.

C. Division 26: Site wiring and connections for main power, including disconnect switches at each motor location. Site wiring and connections for control, including installation of key switches.

1.03 SYSTEM DESCRIPTION

A. General

1. Description: A vertically retractable wall (henceforth, "operable wall") is an acoustical operable wall made of a grid of rectangular acoustical panels that:
   a. when in the down position (closed) is comprised of two hard, rigid, flat, and plumb vertical planes of acoustical panels separated by an acoustical air space.
   b. when lifted (opened), folds upward (vertically) without the use of any manual labor, in a manner similar to an accordion, into a pocket in the ceiling, between roof joists, or up between built-in bulkheads.
2. Design life: Minimum 10,000 complete cycles, closed to opened to closed.
3. Weight: Maximum 7.5 lbs per ft² (36.6 kg per m²), excluding the weights of the motor drive and the architectural finish on the acoustical panels.
4. Acoustics A completely functioning operable wall shall achieve the following minimum ratings when tested by an independent laboratory.
   a. Sound Transmission Class (STC) rating (Rw value) per ASTM E90 (ISO 140-3)
      1) System: STC 50 (Rw 49).
      2) Panel Construction: STC 60 (Rw 58).
   b. Noise Reduction Coefficient (NRC) per ASTM C423 (ISO 354): NRC 0.65 (SAC 0.65).

B. Configuration

1. Panels
   a. Panels shall be rectangular, nominally of the same size, unless requested otherwise by the architect.
   b. Panel edges shall be right angled, with a minimum radius not more than 1/16” (1.6 mm).
   c. Joints between panel, vertical and horizontal, shall be no more than approximately ½” (12.7 mm) wide.
   d. Each acoustical panel shall be individually removable using only a screwdriver. No special tools or equipment shall be required. The removal of a single acoustical panel shall not affect, dislocate or cause the removal of any adjacent panels or other acoustical panels.

2. Controls
   a. There shall be two (2) switches per operable wall, located on opposite sides of the wall at opposite ends of the wall, wired in series.
   b. One switch shall be equipped with an LED that flashes fault codes in case of a failure with the electrical system.
3. Operable wall
   a. In the up (open) position
      1) The operable wall shall stack into a space no greater than 65” (1650mm) wide.
      2) The operable wall shall have a stacking height ratio in the range of 1:5 to 1:10, depending on the height of the wall.
   b. In the down (closed) position
      1) The operable wall shall be visibly flat and rigid.
      2) There shall be no exposed hinges, brackets, or screws, and no part of the mechanical system shall be visible.
      3) The operable wall shall automatically and acoustically seal against the ceiling without any manual intervention.
         (a) The top seals shall leave a joint between the top acoustical panels and the ceiling of the pocket of not more than approximately 2” (51 mm).
      4) The operable wall shall automatically and acoustically seal against the floor without the need for any manual intervention.
         (a) The floor seals shall leave a joint between the floor and the bottom acoustical panels of not more than approximately 2” (51 mm).
      5) The operable wall shall automatically and acoustically seal against the two end walls without the need for any manual intervention.
         (a) The end seals shall leave a joint between the acoustical panels and the end walls of no more than approximately 1” (25 mm).
         (b) The end seals shall act in such a way as to avoid contact with the end walls while the operable wall is in motion.
         (c) Once the wall reaches the full down position, the end seals shall activate automatically. The key switch does not need to be held during the deployment of the end seals.
         (d) Seals that rub or brush against the end walls during opening or closing are not acceptable.

C. Operation
1. The operable wall shall open and close in a manner similar to an accordion. All wall panels shall fold and unfold at the same time and the same rate.
   a. Average design speed: Approximately 5 to 10 vertical feet per minute (1.5 to 3 meters per minute).
2. From a fully open position, the operable wall shall be able to go through its entire cycle of closing and/or opening without any manual intervention.
3. The operable wall shall be opened and closed using two push button switches wired in series with power controlled by a single, three position key switch. Turning the key from the “off” position shall cause the wall to move in the designated direction “up” or “down” once both push buttons are depressed. When hand pressure is removed, the wall shall immediately stop in a quick and positive fashion without coasting.
4. When the operable wall is being lowered (closed), it shall come automatically to rest once it has reached the fully down (closed) position.
5. When the operable wall is being lifted (opened), it shall come automatically to rest once it has reached the fully up (open) position.

6. As a normal part of the operation, it shall be possible to partially open (or close) the wall, stop it, and then reverse the operation.
7. When the operable wall is being lowered (closed), it shall stop if the leading (bottom) edge comes into firm contact with any object between it and the floor. The wall will then automatically reverse its direction and ascend for approximately 3 seconds to clear the object. Once the obstruction has been removed, the regular operation of the wall can resume.

1.04 QUALITY ASSURANCE

A. All work and materials specified herein, shall be installed only by qualified representatives and/or installers and/or distributors of the manufacturer, according to the manufacturers written instructions.
B. The operable wall must be manufactured by a certified ISO-9001-2008 company or an equivalent quality control system.

1.05 REFERENCES

A. ASTM E90, Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
B. Annex A1.15 Operable (Folding or Sliding Walls)
C. Annex A1.15.3 Operation – “The specimen shall not be designated an operable wall unless it opens and closes in a normal manner. It shall be fully opened and closed at least five times after installation is completed and tested without further adjustments.”
    1. ASTM E413, Classification for Rating Sound Insulation.
    2. ASTM E557, Standard Practice for Architectural Application and Insulation of Operable Partitions.
D. ISO 354, Measurement of Sound Absorption
E. ISO 140-3, Measurement of Airborne Sound Insulation
F. ASTM C423, Measurement of Sound Absorption

1.06 SUBMITTALS

A. Submit manufacturers’ technical data for each type of operable wall specified herein.
B. Submit shop drawings showing complete layout of operable wall system based on field verified dimensions. The drawings shall include dimensional relationship to adjoining work. Include details indicating materials, finishes, tolerances, and methods of attachment to building steel and electrical requirements.
C. Submit certified test reports evidencing compliance to acoustical STC (Rw) requirements.

1.07 SITE CONDITIONS

A. The floor underneath the operable wall along its axis shall be flat to within 1/4" (6 mm) over the entire length of the operable wall. Peaks and troughs varying up to 1/4” (6 mm) shall not be closer together than 24” (610 mm). Peaks and troughs varying up to 1/8” (3 mm) shall not be closer than 12” (305 mm).
B. Support steel above the operable wall along its axis shall be parallel to the floor within 1/2" (12.7 mm) for the entire length of the operable wall, including loaded deflection. The beam shall be parallel to the center line of the wall within 1/8” (3 mm), left to right.
C. The fixed walls at either end of the operable wall shall be flat and plumb to within 1/4” (6 mm).

1.08 WARRANTY

A. Basic Warranty: The operable wall shall be warranted free from defects in material and workmanship for a period of two (2) years or five thousand (5,000) cycles, whichever occurs first, from the date of shipment.
B. Acoustical Performance: The operable wall shall retain its acoustical properties for 10 years from the date of shipment providing proper maintenance has been performed on the operable wall.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURER
A. Skyfold Inc. of Baie d'Urfe (Montréal), Québec, Canada.
1. Model: Skyfold Classic NRC.
B. The products of other manufacturers are acceptable subject to compliance with these specifications.

2.02 2.2 MATERIALS
A. Acoustical Panels
1. Acoustical panels shall be faced with steel that is compatible with a wide variety of architectural finishes such as paint, vinyl, acoustically transparent fabric, specialty metals, wood veneer, etc.
2. Acoustical panels and sound insulation shall be made of non-combustible or fire-treated materials.
3. Acoustical panels shall be fabricated for rigidity when the operable wall is down (closed) and for the avoidance of interference between panels when the wall is in motion.
4. Acoustical panels shall be architecturally flat with no bowing, oil canning, warping, waviness or any other surface deformation and discontinuity.
5. Acoustical panels shall have an architecturally transparent fabric finish meeting the following criteria.
a. Maximum weight: 0.111 lbs/ft² (0.542 kg/m²).
b. Maximum thickness: 1/8" (3mm).
c. No brittle materials.
6. Finishes shall be railroaded onto the panels, applied horizontally along the panel length.
7. Acoustical panels shall meet the following STC rating per ASTM E90 (ISO 140-3): STC 60 (Rw 58).
B. Folding Mechanism
1. The hanging, folding and extension mechanism shall be, as much as possible, made from structural grade aluminum extrusions and structural shapes to minimize the weight of the system.
2. All wear surfaces, such as bushings, spacers, pins, discs, bearings, and sleeves, shall be designed to function quietly and with minimum wear over the 10,000-cycle design life of the operable wall.
3. Hangers fastening the lifting mechanism to support steel shall be fabricated from steel.
a. Welded or bolted connections to support steel shall be supplied by others.
C. Motor Drive
1. The motor drive shall be sized to deliver sufficient torque to open and close the wall effectively over the specified design life of the wall at the specified average design speed.
2. The motor drive shall meet the latest industry standards for thermal and electrical protection.

3. The folding mechanism shall function smoothly and quietly using ball bearings wherever possible instead of bushings and other types of wearing surfaces.
4. The drive system shall utilize cables. Chain drive and belt drive systems shall not be acceptable.
    a. Each set of folding mechanisms shall be supported by galvanized steel aircraft cables of 6 x 31 construction and of sufficient diameter to hold the entire weight of the wall with the appropriate safety factor.
    b. The cables shall wrap on yoyo drums with two safety wraps and multiple layers of cable.
    c. The line shaft shall support and rotate the yoyo drums and shall be sized to deliver the required torque with minimum deflection.
    d. Flange bearings shall be located immediately on both sides of the drum assembly.

D. Safety Equipment
1. The operable wall shall employ an electromagnetic brake which shall activate firmly, without hesitation, when power is lost to the system. This brake shall have a minimum retarding torque rating equal to 200% of the motor drive's full load torque.
2. The drive system shall be equipped with a manual override and a brake release lever.
3. The operable wall shall employ a dynamic brake distinct and separate from the electromagnetic brake specified above that shall lower the wall at a controlled speed of no more than approximately 150% of the normal down speed in the case of a catastrophic failure in the motor drive's power train.
4. The operable wall shall employ limit switches to stop the wall at its up and down travel limits.
5. The operable wall shall employ an over torque detector to sense a jam in the system and to act as an over travel limiter in the up direction should the primary limit switches fail to act. This over torque sensor shall be mechanical, using the motor's torque arm in its over torque detection.
6. The entire length of the operable wall's bottom edge shall be equipped with a continuous pressure sensing strip.
    a. If the sensing strip comes into firm contact with an object before the operable wall is in the full down (closed) position, it shall cut power to the motor drive and shall activate the electromagnetic brake specified above.
    b. The operable wall will automatically reverse direction and ascend for approximately 3 seconds to clear the obstruction.
    c. The power shall remain cut to the motor drive until the switches have been released.
    d. The operation of the operable wall can resume once the obstruction is removed.

E. Electrical
1. The operable wall shall be equipped for a three-phase power supply to the electrical control box.
2. Electrical control box: NEMA 1.
3. Low voltage wiring (by others): 18-gauge wiring from the switches to the control box.
4. Switches: Two (2) push button switches wired in series with power, controlled by a single, three position key switch. One push button switch shall be equipped with an LED that flashes fault codes in case of an electrical system failure.
    a. Installation and wiring by others.

2.03 FABRICATION

A. Factory-assemble all components, assemblies and systems into the largest possible transportable assembly sizes in order to minimize the amount of assembly on site.

PART 3 EXECUTION

3.01 INSPECTION

A. Inspect the relevant aspects of the site such as the evenness of the floor, walls, structural steel, etc., and ensure that these are within required tolerances.
   1. Notify Construction Manager in writing of any deviations from these tolerances.
   2. Do not proceed until nonconforming conditions are corrected.

B. Carry out all appropriate field measurements before manufacturing any components or assemblies.

3.02 INSTALLATION

A. The operable wall supplier shall not deliver or install this product until the Construction Manager can ensure in writing safe storage and protection for the operable wall for the duration of the project.

B. Install operable walls in accordance with the manufacturer's printed instructions.

3.03 ADJUSTING AND CLEANING

A. Adjust and test the operable walls until they operate smoothly and correctly and that seals are operating and sealing properly.
   1. Continue adjusting and testing until the operable wall has been fully opened and closed at least five times without the need for further adjustments.

B. Clean acoustical panels of dirt, oil, grime, and other contaminants. Leave the wall in a state of architectural cleanliness.

END OF SECTION

SECTION 10 26 00 - WALL PROTECTION

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Corner guards.
- B. Protective wall covering.

1.02 RELATED REQUIREMENTS
- A. Section 061000 - Rough Carpentry: Blocking for wall and corner guard anchors.
- B. 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 2010 (Reapproved 2018).
- 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 2021a.
- D. ASTM F476 - Standard Test Methods for Security of Swinging Door Assemblies 2014.
- 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, anchorage details, and rough-in measurements.
- C. Material Test Reports: For each impact-resistant plastic material.
- D. Samples for Initial Selection: For each type of impact resistant wall protection unit indicated.
- E. 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 QUALITY ASSURANCE
- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
- B. Source Limitations: Obtain impact-resistant wall protection units through one source from a single manufacturer.
- C. FireTest Response Characteristics: Provide impact resistant, plastic wallprotection units with surfaceburning characteristics as determined by testing identical products per ASTM E 84, NFPA 255, or UL 723 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1.06 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.

1.07 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
B. Correct defective Work within a two year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Corner Guards:
   1. Basis of Design: Construction Specialties, Inc; Acrovyn Solid Color and Chameleon Corner Guards: www.c-sgroup.com/#sle.
   2. Inpro: www.inprocorp.com/#sle.
   3. Substitutions: See Section 016000 - Product Requirements.
B. Protective Wall Covering (WP-1):
   1. Construction Specialties, Inc; Acrovyn High-Impact Wall Covering: www.c-sgroup.com/#sle.
   2. Inpro: www.inprocorp.com/#sle.
   3. 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 - Stainless Steel:
   1. Material: Type 304 stainless steel, No. 4 finish, 16 gage, 0.053 inch thick.
   2. Width of Wings: 3-1/2 inches.
   3. Corner: Radiused, 3/16"
   4. Length: One piece.
   5. Location: Outside corners in Kitchen areas.
B. Corner Guards - Surface Mounted:
   1. Material: High impact vinyl with full height extruded aluminum retainer.
   2. Performance: Resist lateral impact force of 100 lbs at any point without damage or permanent set.
   3. 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.
   4. Width of Wings: 3 inches.
   5. Height: 6'-0", unless otherwise noted.
   6. Corner: Radiused.
   7. Color: As selected from manufacturer's standard colors.

8. Length: One piece.
9. Preformed end caps.
10. Location: As indicated.

C. Adhesives and Primers: As recommended by manufacturer.

D. Mounting Brackets and Attachment Hardware: Appropriate to component and substrate.

E. FRP Wall Panels

1. Manufacturer and Product:
   a. Marlite; Standard FRP; www.marlite.com
   b. Substitutions: See Section 016000.
2. Material: Fiberglass reinforced thermosetting polyester resin panel sheets complying with ASTM D 5319.
   a. Coating: Multi-layer print, primer and finish coats or applied over-layer.
   b. Thickness – 0.090 " (2.29mm) nominal
   c. Width - 4'-0" (1.22m) nominal
   d. Fire Rating: Class A (I)
3. Surface texture: Pebbled.
4. Moldings and trim: Aluminum, clear anodized.
5. Location: Custodial Closets as scheduled.

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.

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.

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 above finished floor to 76 inches high.

C. Protective wall covering installation:

1. Wainscot Installation: Establish a level line at the specified height for entire length of run. Install by aligning top of edge of covering with this line.
2. Apply adhesive with 1/8 inch V-notch trowel to an area of wall surface that can be completed within cure time of the adhesive.
3. Install trim pieces as required for a complete installation. Allow tolerance for thermal movement.

3.03 CLEANING

A. Clean wall and door protection items of excess adhesive, dust, dirt, and other contaminants.

END OF SECTION

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SECTION 10 28 00 - TOILET ACCESSORIES

PART 1 - GENERAL

1.01 SECTION INCLUDES
- A. Commercial toilet accessories.
- B. Electric hand dryers.

1.02 RELATED REQUIREMENTS
- A. Section 06 1000 - Rough Carpentry: Concealed supports for accessories, including in wall framing and plates and above ceiling framing.
- B. Section 10 21 13.19 - Plastic Toilet Compartments.

1.03 REFERENCE STANDARDS
- A. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service 2015.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- D. ASTM C1036 - Standard Specification for Flat Glass 2011.
- E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.

1.04 ADMINISTRATIVE REQUIREMENTS
- A. Coordinate the work with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

1.05 SUBMITTALS
- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

PART 2 PRODUCTS

1.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide accessories by one of the following:
   1. Toilet and Bath Accessories:
      a. Basis of Design: Bobrick Washroom Equipment, Inc.
      b. Unless noted otherwise.

1.2 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, with No. 4 finish (satin), in 0.0312-inch (0.8-mm) minimum nominal thickness, unless otherwise indicated.

B. Brass: ASTM B 19, leaded and unleaded flat products; ASTM B 16 (ASTM B 16M), rods, shapes, forgings, and flat products with finished edges; ASTM B 30, castings.

C. Sheet Steel: ASTM A 366/A 366M, cold rolled, commercial quality, 0.0359-inch (0.9-mm) minimum nominal thickness; surface preparation and metal pretreatment as required for applied finish.

D. Galvanized Steel Sheet: ASTM A 653/A 653M, G60 (Z180).

E. Mirror Glass: ASTM C 1036, Type I, Class 1, Quality q2, nominal 6.0 mm thick, with silvering, electroplated copper coating, and protective organic coating complying with FS DD-M-411.

F. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

G. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

1.3 TOILET ACCESSORIES

A. REFER TO TOILET ACCESSORIES SCHEDULE IN DRAWINGS FOR ITEMS PROVIDED BY OWNER AND INSTALLED BY CONTRACTOR.

B. Basis-of-Design Products: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
1. Bobrick Washroom Equipment, Inc.
2. Bradley Corporation.
3. Approved Equal.

C. Sight & Urinal Screen
1. Basis of Design Product: Bradmar Solid Plastic Urinal Screen
2. Material: 1” thick HDPE (Waterproof, non-absorbent, resistant to marks and graffiti)
3. Size: 48” high x 24” wide, 12’ AFF
4. Mounting: Wall hung with continuous heavy-duty aluminum 2-ear brackets at 13” o.c.
5. Provide blocking as necessary.
6. Color: TBD by architect from manufacturer’s full range.

D. Liftable Shower Seat
1. Basis of Design Product: Bradley Folding Phenolic Shower Seat
2. Model #: 9562
3. Finish & Material: Satin Finish Stainless Steel Frame and ½” Solid Phenolic Seat
4. Supports Static Load of 500 lbs
5. ADA Compliant

E. Shower Curtain Rod
1. Basis of Design Product: Bradley Model #953
2. Material and Construction: Straight shower curtain rod with 22 ga. Stainless Steel mounting flanges and exposed fasteners. 18 ga. 1” OD seamless stainless steel tubing.
3. Size: Suitable for 36-72” shower stall.

4. Finish: Satin Finish

F. Shower Curtain
1. Basis of Design Product: Bradley Shower Curtain #9537
2. Antimicrobial 9 oz. nylon-reinforced PVC vinyl shower curtain, white. Reinforced, flameproof, stain resistant, self-deodorizing fabric. Hemmed edges and aluminum grommets on 6" centers at top edge.
3. Sizes: as noted on drawings.
4. Hooks: Bradley #9540 – Stainless steel spring wire clip with snap fastener, with 5 nickel plated brass rollers on each hook. Suitable for use with 1" and 1-1/4" shower curtain rods.

G. Waste Receptacle:
1. Basis-of-Design Manufacturer: Bradley Surface Mounted Waste Receptacle
2. Model #:
   a. #357 for 6.5 Gallons
   b. #355 for 20.6 Gallons
   c. Locations as noted on drawings.
3. Material and Finish: Architectural Satin finish Stainless Steel. Seamless welded construction. Secured to wall through rear mounting holes.

H. Feminine Product Dispenser:
1. Basis of Design Product: Bobrick Contura Series #B-47069C
2. Size: 14-3/8"W x 28-3/8"H
3. Type 304 Stainless Steel skirt for surface mounting.
4. Free vending push button operation (less than 5lbs of force, no grasping, pinching, or twisting of the wrist.)

I. Toilet Seat Cover Dispenser
1. Basis of Design Product: Bobrick Surface Mounted Seat Cover Dispenser
2. Model #: B-221
3. Finish: Satin Stainless Steel

J. Framed Mirror:
1. Basis-of-Design Product: Bobrick Model # B-290-2436
2. Mounting and Size: Surface mounted. Mirror with welded, seamless satin stainless steel angle frame, with concealed screw mounting and hanging bracket, size 24 x 36 unless noted otherwise on drawings.

K. Grab Bar:
1. Basis-of-Design Manufacturer: Bobrick.
2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 0.05 inch (1.3 mm) thick.
   a. Finish: Smooth, No. 4 finish (satin) on ends and slip-resistant (preened grip) texture in grip area.
4. Outside Diameter: 1-1/4 inches (32 mm).
5. Configuration and Length:
   a. Vertical at 18 inch lengths - Model # B-6806.99 x 18"
   b. Horizontal at 24 inch lengths - Model # B-6806.99 x 24"
   c. Horizontal at 36 inch lengths - Model # B-6806.99 x 36"

d. Horizontal at 42 inch lengths - B-6806.99 x 42”
e. Horizontal at 54 inch lengths - B-6806.99 x 54”

L. Sanitary Napkin Disposal:
1. Basis-of-Design Manufacturer: Bobrick.
2. Mounting: Surface mounted sanitary napkin disposal unites. Type 304, 22 gauge stainless steel with all welded construction. Hinged cover are Type 304, 22 gauge stain. Secured to container with full-length stainless steel piano-hinge. All exposed surfaces shall have satin finish.
3. Model Type: Contura Series Bobrick B-270

M. Shelf with Mop and Broom Holders and Rag Hooks: Bobrick Model # B-224 x 36”

N. Single Robe Hook: Surface Mounted, 2” x 2” square by 2” projection satin stainless steel with concealed mounting bracket. Bobrick Model # B-6717.

1.4 FABRICATION

A. General: One, maximum 1-1/2-inch diameter, unobtrusive stamped manufacturer logo, as approved by Architect, is permitted on exposed face of accessories. On interior surface not exposed to view or back surface of each accessory, provide printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number.

B. Surface-Mounted Toilet Accessories: Unless otherwise indicated, fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with continuous stainless-steel hinge. Provide concealed anchorage where possible.

C. Recessed Toilet Accessories: Unless otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors and access panels with full-length, stainless-steel hinge. Provide anchorage that is fully concealed when unit is closed.

D. Framed Glass-Mirror Units: Fabricate frames for glass-mirror units to accommodate glass edge protection material. Provide mirror backing and support system that permits rigid, tamper-resistant glass installation and prevents moisture accumulation.

1. Provide galvanized steel backing sheet, not less than 0.034 inch and full mirror size, with nonabsorptive filler material. Corrugated cardboard is not an acceptable filler material.

E. Mirror-Unit Hangers: Provide mirror-unit mounting system that permits rigid, tamper- and theft-resistant installation, as follows:
1. Heavy-duty wall brackets of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.

F. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

1.5 UNDERLAVATORY GUARDS

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

1. Plumberex Specialty Products, Inc.
2. TCI Products
3. Truebro Inc.

B. Underlavatory Guard:
   1. Description: Insulating pipe covering for supply and drain piping assemblies that prevent direct contact with and burns from piping; allow service access without removing coverings.
   2. Material and Finish: Antimicrobial, molded plastic, white

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.

3.02 PREPARATION
   A. Deliver inserts and rough-in frames to site for timely installation.
   B. Provide templates and rough-in measurements as required.

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.

3.04 PROTECTION
   A. Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION

SECTION 10 44 00 - FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.01 SECTION INCLUDES
- A. Fire extinguishers.
- B. Fire extinguisher cabinets.
- C. Accessories.

1.02 RELATED REQUIREMENTS
- A. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.
- B. Section 211200 - Fire-Suppression Standpipes: Valve cabinet enclosure for standpipes. and blankets

1.03 REFERENCE STANDARDS
- A. NFPA 10 - Standard for Portable Fire Extinguishers 2017, with Errata (2018).
- B. UL (DIR) - Online Certifications Directory Current Edition.

1.04 SUBMITTALS
- A. Product Data: Provide extinguisher ratings and classifications.
- B. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.
- C. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.05 FIELD CONDITIONS
- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.01 MANUFACTURERS
- A. Fire Extinguishers, Fire Extinguisher Cabinets and Accessories:
  1. JL Industries, Inc: www.jlindustries.com.
  2. Larsen's Manufacturing Co: www.larsensmfg.com.
  3. Potter-Roemer: www.potterroemer.com.
  4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FIRE EXTINGUISHERS
- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
- B. Dry Chemical Type Fire Extinguishers: Cast steel tank, with pressure gage.
  1. Type: 2A:10B:C.
  2. Class: A,B & C.
  3. Size: 5 pound multi-purpose.
  4. Finish: Baked enamel, color as selected.

C. K Type Extinguisher: Provide Wet Chemical (WC- 6L) Class K fire extinguishers with standard bracket in kitchen. (Maximum travel distance from cooking fire hazard to extinguisher = 30')
   1. Type 2A:K
   2. 6 liters
      a. Provide three (3) K Type Extinguishers (minimum).
      b. Approved manufacturers: JL Industries, Larsen's, or Elkhart.

2.03 FIRE EXTINGUISHER CABINETS **(FEC)**

A. Metal: Formed primed steel sheet.

B. Cabinet Configuration: Basis of design Larsen architectural series. Manufacturers offering cabinets that may meet the basis of design specification and design intent include, but are not limited to:
   JL Industries
   Safety one

   1. Non-rated cabinet for mounting in Stud walls: Provide Semi-Recessed cabinet.
      1) Basis of Design: Larsen 2409-6R
      2) Internal Dimensions: 24”H x 9 1/2”W x 6”D
      3) Rough Opening Dimensions: 25”H x 10 1/2”W x 4”D
   2. Fire-rated cabinet for mounting against Stud walls: Provide Semi-Recessed cabinet.
      1) Basis of Design: Larsen FS 2409-6R
      2) Internal Dimensions: 24”H x 9 1/2”W x 6”D
      3) Rough Opening Dimensions: 26 1/8”H x 11 5/8”W x 4 7/8”D
   3. For mounting against CMU walls: Provide Surface Mounted cabinet with mounting height to be less than 27” from finish floor to bottom of cabinet to meet accessibility requirements.
      1) Basis of Design: Larsen 2409-SM
      2) Internal Dimensions: 27.5”H x 13”W x 6”D
      3) Rough Opening Dimensions: N/A
   4. Trim: 2 1/2” Backbend
   5. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim and door stiles.

C. Door: 1/2 inch thick, reinforced for flatness and rigidity; latch. Hinge doors for 180 degree opening with continuous piano hinge.

D. Door Style and lock: Recess mounted, vertical duo style, 18 gauge pressed steel construction with Duo-Panel doors and emergency safety locks (such as Larsen-Loc/Saf-T-lok).

E. Verify that cabinets are sized to accommodate extinguishers.

F. Door Glazing: Clear tempered safety glass, 1/8 inch thick, and set in resilient channel glazing gasket.

G. Lettering: Vertical, die cut, white.

H. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.

I. Fabrication: Weld, fill, and grind components smooth.

J. Finish of Cabinet Exterior Trim and Door: No.4 - Brushed stainless steel.

K. Finish of Cabinet Interior: White colored enamel.

2.04 HOSE VALVE CABINETS (FPHVC)

A. Non-rated cabinet:
   1. Basis of design: Guardian 2040.
   2. Inside Box Dimensions: 18"W x 18"H x 8"D.
   3. Rough Opening Dimensions: 19"W x 19"H x 6"D.
   4. Trim Projection: 2 1/2".
B. Fire-rated cabinet:
   1. Basis of design: Guardian FR2040.
   2. Inside Box Dimensions: 18"W x 18"H x 8"D.
   3. Rough Opening Dimensions: 20 1/8"W x 20 1/8"H x 7"D.
   4. Trim Projection: 2 1/2".

2.05 ACCESSORIES

A. Extinguisher Brackets: Formed steel, chrome-plated.
B. Cabinet Signage: 3-D Fire Extinguisher Rigid Plastic Angle Sign – #PTD182..

2.06 ADDITIONAL EQUIPMENT

A. Provide 4 Dry Chemical Type fire extinguishers and cabinets in addition to those shown on contract documents.

2.07 OTHER EQUIPMENT

A. AED Cabinets: Philips Model PFE7023D.
   1. Semi-Recessed with Audible Alarm and Strobe Light
   2. Provide 3D wall sign, MacGill item 12325 or equivalent
   3. Quantity: 4
   4. Other approved manufacturers/products: Activar 1417F12FX2 Semi-Recessed Cabinet with 3” Rolled Trim & Silkscreen AED Graphic
B. Epinephrine Cabinet/AED Combo: same as AED cabinet.
   1. Semi-Recessed with Audible Alarm and Strobe Light
   2. Provide 3D wall sign, AED /Epinephrine, MacGill item 16285 or equivalent
   3. Quantity: 2.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.
B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.
B. Install cabinets plumb and level in wall openings.
C. Secure rigidly in place.
D. Place extinguishers in cabinets.

END OF SECTION

SECTION 10 51 00 - METAL LOCKERS

PART 1 - GENERAL

1.01 SECTION INCLUDES
- A. Metal bases, tops, filler panels, and related components.

1.02 RELATED REQUIREMENTS
- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete base construction.
- B. Section 06 10 00 - Rough Carpentry: Wood blocking and nailers.

1.03 REFERENCE STANDARDS
- A. ASTM A 1008 - Standard Specification for Steel Sheet, Carbon, Cold-Rolled, Commercial Quality.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.

1.04 SUBMITTALS
- A. Product Data: Manufacturer's published data on locker construction, sizes and accessories.
- B. Shop Drawings: Indicate locker plan layout and numbering plan.
- C. Samples: Submit two samples 12 by 12 inches in size, of each color scheduled.
- D. 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. List Industries: www.listindustries.com
  2. ASI Lockers: www.asilockers.com
  3. Lyon Workspace Products: www.lyonworkspace.com.
  4. Penco Products, Inc: www.pencoproducts.com.
  5. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 LOCKER UNITS
- A. Material: Mild cold rolled commercial quality steel, ASTM A1008, stretcher level, phosphatized; to the following minimum thicknesses:
- B. Sizes and Configurations: As noted on Drawings.
  1. Accessible Units: Five percent (5%) of units shall have shelf, hook, and latch in locations that comply with ADA reach range requirements.
- C. Finish: Steel surfaces shall be power washed, phosphate treated and finished with an electrostatically applied 2 mm thick hybrid epoxy/polyester powder coating and baked.
- D. Construction: Lockers shall be built on a unitized principle with common intermediate uprights separating units.
- E. Knocked Down Assembly: All locker components shall be assembled with nuts and bolts.

F. Body:
   1. Body and Shelf: 16 gage.
   2. Bottoms: 16 gauge.
   3. Backs: 18 gauge.
   4. Sloping Top: 18 gage.
   5. Trim: 18 gage.
   6. Sides and Shelves, Knocked Down: 24 gauge.
   7. Bolt spacing shall not exceed 9 inches (228 mm) on center.

G. Door Frames:
   1. 16 gauge formed in a channel shape.
      a. Vertical members shall have additional flange to provide a continuous door strike.
   2. Double Tier Lockers: Include intermediate cross frames.
      a. Cross frame members; 16 gauge channel shaped.

H. Doors: Knocked Down
   1. 16 gauge with louvers.
   2. Channel shaped on both the lock and hinge side, with angle formations across the top and bottom.

I. Hinges: Full length 16 gauge continuous piano type, riveted to both door and frame.

J. Latching
   1. Doors to have latch clip engaging frame at three points on doors over 42 inches (1.067 m) high and two points on all other doors.
   2. Locking device to be positive automatic type whereby locker door may be locked when open, then closed without unlocking.
   3. 1-3 tiers lifting trigger, 14 gauge steel, attached to the latching channel.
      a. Trigger shall have a padlock eye for use with 9/32 inch (7 mm) diameter padlock shackle.
   4. A rubber silencer shall be firmly secured to the frame at each latch hook.

K. Interior Equipment
   1. Double Tier lockers shall have three wall hooks and one ceiling hook.

L. Number Plates: Each locker shall have a polished aluminum number plate riveted to door face. Form numbers of block font style with ADA designation, in contrasting color.

M. Accessories
   1. Continuous sloped top with end fillers.
   2. Fabricate sloped metal tops, ends and closure pieces.
   3. Perforated end panels and filler strips.

N. Finish: Paint locker units in colors to be selected from manufacturer's standard color selection.

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. Install lockers plumb and square.
C. Place and secure on locker base. Minimum pull out force 100lbs.
D. Bolt adjoining locker units together to provide rigid installation.
E. Install end panels.

F. Install accessories.

G. Replace components that do not operate smoothly.

3.03 CLEANING

A. Clean locker interiors and exterior surfaces.

END OF SECTION

SECTION 10 73 16.13
METAL CANOPIES

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Attached metal canopies.

1.02 RELATED REQUIREMENTS
- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete footings.

1.03 REFERENCE STANDARDS
- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2020.
- B. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2022.
- C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2022.
- D. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2022.
- E. AISC 303 - Code of Standard Practice for Steel Buildings and Bridges 2022.
- F. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- G. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- H. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2021.
- I. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2021a.
- J. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel 2021, with Editorial Revision.
- K. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process 2022.
- L. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2021a.
- M. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- N. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- O. ASTM B308/B308M - Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles 2020.
- P. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2020.
- Q. ASTM E2950 - Standard Specification for Metal Canopy Systems 2014 (Reapproved 2020).
- R. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs 2022.

S. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2022.
T. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification 2021.
U. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2023).
V. AWS D1.2/D1.2M - Structural Welding Code - Aluminum 2014, with Errata (2020).

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
B. Product Data: Submit product data sheets, including material descriptions and finishes, and preparation instructions and recommendations.
C. Shop Drawings: Prior to commencement of fabrication, submit detailed shop drawings, showing profiles, sections of components, finishes, and fastening details.
D. Design Data: Submit comprehensive structural analysis of design for the specified loads. Stamp and sign calculations by professional engineer.
E. Designer's Qualification Statement.
F. Manufacturer's Qualification Statement.
G. Erector's Qualification Statement.
H. 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.
I. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 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. Perform steel work in accordance with AISC 303.
    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.
D. Erector Qualifications: Company specializing in performing the work of this section.
    1. Not less than three years of documented experience and approved by canopy 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.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site ready for erection.
B. Package using methods that prevent damage during shipping and storage on site.
C. Store materials under cover and elevated above grade.

1.07 WARRANTY

A. See Section 01 78 00 - 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 one year warranty on factory finish against cracking, peeling, and blistering.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Canopies:
    1. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 METAL CANOPIES

A. Shop Fabricated Steel Canopy
    1. Pre-engineered steel system complying with ASTM E2950.
B. Configuration: Layout and dimensions, column layout, canopy clearance, fascia profile, and roof covering design as indicated on drawings.
    1. Installation: Face-mounted to building structure.
    2. Structural Framing System: Aluminum.
    3. Covering Material: Aluminum.
    4. Drainage Concept: Water collected in decking conducted into perimeter gutters 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 Steel Framing:
    1. Columns: ASTM A500/A500M, Grade B, round or rectangular tubing, sized to suit project design load requirements.
    2. Base and Top Plates: ASTM A36/A36M, with pre-drilled bolt holes.
    3. Beams: Wide flange, ASTM A572/A572M Grade 50.
    4. Other Structural Steel Members: ASTM A36/A36M.
B. Structural Aluminum Framing: Alloy and temper 6063-T5, 6063-T6, or 6061-T6.
    1. Extruded Shapes and Tubes: ASTM B221 (ASTM B221M).
    2. Sheet and Plate: Alloy 5052, 5005, or 6061-T651, ASTM B209/B209M.
C. Covering:
    1. Aluminum Decking:
        a. Interlocking extruded aluminum decking modules.
            1) Roll-Formed Decking: ASTM B209/B209M, Alloy 5052, 5005, or 6061-T651.
        b. Decking Orientation: As indicated on drawings.
    2. Overhang: As indicated on drawings.
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. Concrete Footings: Refer to Section 03 30 00 for additional requirements.

F. Exposed Gutters and Downspouts: Galvanized steel with baked enamel finish, 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. Structural Steel Framing:

1. Shop Primer: Rust-inhibitive red oxide.

B. Aluminum Framing and Decking:

1. Pigmented Organic Coatings: AAMA 2603, polyester or acrylic baked enamel finish.
2. Color: As indicated on the drawings.

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.

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. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation.

B. Set column base plates with non-shrink grout to achieve full plate bearing.

C. Fasten columns to anchor bolts.

D. Do not field cut or alter structural members without approval.

E. 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 CLEANING

A. Clean surfaces of dust and debris; follow manufacturer's cleaning instructions for the finish used.

3.05 PROTECTION

A. Protect canopy after installation to prevent damage due to other work until Date of Substantial Completion.

END OF SECTION 10 73 16.13

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SECTION 11 40 00
FOODSERVICE EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

A. Provide all material, labor, equipment and services required to execute and complete all items of work relating to the food service equipment, both existing and new, all as required to make the resulting facility a fully functional and reliable operating unit in accordance with this Specification. All food service equipment shall be furnished as specified, delivered prepaid, unloaded and uncrated, assembled with all components and accessories connected within the equipment, set-in-place in proper location as indicated on the drawings, leveled and fastened to the wall, ceiling or floor as required, left ready for final utility connections. The work shall include:

1. To prevent extended warehousing of all food service equipment, no pre-ordering of equipment is permitted; schedule ordering of the equipment so that warehousing of the equipment shall not be required for longer than 60 days prior to delivery to the site for installation.
2. All food service equipment shall have a manufacturer extended warranty covering parts and labor for a period of two years which shall take effect only after acceptance and beneficial use by the District. All labor shall be performed by a factory authorized and qualified representative.
3. A “complete and thorough” demonstration and start-up for each item of equipment must be conducted by a qualified manufacturer representative in the use, sanitation and maintenance of the equipment.

B. Furnishing scheduled items of custom fabricated food service equipment as specified utilizing a food service equipment fabricator listed with the National Sanitation Foundation (NSF) for custom equipment fabrication.

C. Delivery of food service equipment in factory fabricated containers designed to protect equipment and finish until final installation. Delivery of food service equipment shall be coordinated with the construction schedule. If necessary, delivery of the food service equipment shall be by means other than common carrier to expedite delivery and to maintain project schedule.

D. Warehousing of the food service equipment in a bonded warehouse and re-delivery of the food service equipment from the storage facility to the project site or arrangement for secured storage

at the project site to assure availability of the food service equipment to maintain project schedule.

E. Field installation of the food service equipment including buy out equipment at the project site including on site receiving and unloading, uncrating from packing containers, conveyance of the food service equipment from the receiving area to the installation location, erection and assembly of the food service equipment including field welding and polishing of sub assemblies and installation of fixtures and components and setting in place in final location.

F. Removal and disposal of discontinued items of food service equipment not to be reused including costs for transport and scrapping. This shall include pump-down and reclaim of refrigerant and fire system propellant and disposal costs of all refrigeration systems as required. Utility disconnection and termination of utility services shall be provided by the Plumbing, Electrical and Mechanical (HVAC) Trades.

G. Removal and disposal of discontinued items of food service equipment not to be reused including costs for transport and scrapping. This shall include pump-down and reclaim of refrigerant and disposal costs of all refrigeration systems as required. Utility disconnection and termination of utility services shall be provided by the Plumbing, Electrical and Mechanical (HVAC) Trades.

H. Removal, cleaning, servicing, reassemble and reinstallation of items of food service equipment to be reused including warehousing and transportation costs for scheduled items of food service equipment to be refurbished off-site or to be temporarily stored off-site. This shall include pump-down and reclaim of refrigerant and disposal costs of all refrigeration systems as required. Utility disconnection and termination of discontinued services and modification or preparation or relocated utility services shall be provided by the Plumbing, Electrical and Mechanical (HVAC) Trades.

I. Removal, cleaning, servicing, crating and delivery including costs for transport of items of food service equipment to be reused in an alternate location. This shall include pump-down and reclaim of refrigerant and disposal costs of all refrigeration systems as required. Utility disconnection and termination of utility services shall be provided by the Plumbing, Electrical and Mechanical (HVAC) Trades.

J. Removal and disposal of all packing material.

K. All costs for special tools, crane rental or usage cost or rigging as may be required for delivery or installation of the food service equipment.

L. All work is to be performed by skilled labor utilizing the proper Trades having respective jurisdiction thereto. All work shall be performed at hours required to maintain consistent work schedules with all other Trades without additional cost.

M. Preparation of dimensioned utility rough-in floor plans coordinated with the Contract Documents and site conditions and the food service equipment manufacturers' utility connection points for all food service equipment.

N. Assist in the preparation of "chalk-line" mark-up of utility rough-in locations on the building floor at the job site.

O. Take complete financial responsibility for any and all additional expenses resulting from incomplete or inaccurate rough-in drawings or instructions for the final rough-in dimensioning at the job site.

P. Provide complete manufacturers' and fabricator shop drawings of all related items of food service equipment.

Q. Provide competent on site supervision for the coordination of work and to assist and supervise the erection, assembly and installation of the food service equipment, this shall include any moving, shifting or disassembly of the food service equipment to enable work to be performed free of obstruction.

R. Attend all job conferences and meetings.

S. Maintaining coordination and control over the form, fit, function and utility requirements of all food service equipment, from placement of purchase orders through Final Acceptance

T. Provide competent on-site final testing, demonstration and instruction in the use and service of all items of food service equipment in the form of a qualified manufacturer's representative for each item of food service equipment.

U. Providing access to the custom equipment fabricator's shop for inspection of construction and materials used at any time during the progress of fabrication.

V. Field verification of all measurements at the project site prior to the fabrication of custom fabricated and buy-out equipment and correct any deviation from the dimensions indicated on any plans and shop drawing which may affect the final form or fit of any item of food service equipment as a result of final building conditions and actual field dimensions.

W. All food service equipment shall conform to field verified dimensions and to the finished building conditions with edges scribed and sealed to wall surfaces, fitting to and around building obstructions. All joints, seams or surfaces shall be fully sealed with General Electric or equivalent clear silicone sealer.

X. Field verification of delivery access into and through the building to the final equipment location including access and clearance through hallways, doorways and elevators (cab size and weight restrictions); furnish food service equipment in sections or sub-assemblies as required for access.

Y. Keeping the premise free from accumulation of waste material and rubbish caused by his work. At the completion of each workday all waste material and rubbish must be removed and all areas swept broom clean.

Z. Physical damage to equipment, building or previous work completed or in the process of completion shall be repaired or replaced.

AA. Furnish as part of and affixed to the food service equipment, accessories, components and fixtures furnished standard with the equipment as specified or listed as an option and shall include the following:

1. PLUMBING ACCESSORIES: Pop-up, lever or basket type waste outlets, tailpieces, standing or connected overflows, faucets and spray units, vacuum breakers, shut-off and control valves and fittings.
2. STEAM AND GAS ACCESSORIES: Steam supply valves, thermostats, pressure reducing and regulating valves, shut-off and control valves, temperature and pressure gauges, copper steam coils or injector assemblies, traps and fittings
3. ELECTRICAL ACCESSORIES: Terminal blocks, conduit, wiring, signal and pilot lamps, on-off and control switches, control panels, magnetic contactor assemblies, heating elements, junction boxes, outlet boxes and receptacles and cord and plug sets.
4. REFRIGERATION ACCESSORIES: Copper insulated refrigeration tubing, valves, fittings, hangers, high and low pressure control switches, solenoid valves, evaporator coils, expansion valves, condensing units and condensate evaporators.

BB. All built-in accessories, components and fixtures shall be factory installed at the time of fabrication and shall comply with all applicable codes and regulations.

CC. Furnish and install copper insulated refrigeration lines from compressor location to evaporator coils and expansion valves for all refrigeration units and ice makers with remote or refrigeration systems other than self-contained.

DD. Furnish and install flexible stainless steel gas flue tubing from exhaust collar on gas hot water booster heater terminating at the exhaust vent connection at the vent extension or condensate hood.

EE. Furnish 14 gauge galvanized steel welded roof curbs for all refrigeration condensing unit stands and exhaust fans and supply fan make-up air units including setting-in-place and securing to the building roof.

FF. Furnish and install in exhaust hood, plenum, duct and surface fire protection system. Entire system shall be furnished and installed in compliance with UL Standard 1254, UL Standard 300, NFPA 96 and any prevailing statutes or codes including automatic shut-down of all cooking appliances per code section 44 of NFPA 17A-27. The manufacturer of the fire suppression system shall be ISO 9001 registered. The entire installation must conform to ADA (American Disabilities Act) latest edition. The system shall be an automatic fire suppression system using a wet chemical agent for grease related fires. The system shall be the pre-engineered type having minimum and maximum guidelines established by the manufacturer and listed by Underwriters Laboratories (UL). The system shall be installed and serviced by certified personnel trained by the manufacturer. Provide as part of fire system, mechanically operated gas supply line shut-off valve to interrupt gas supply to all gas operated cooking appliances. Gas valve shall be provided with manual reset to prevent gas flow to pilot devices on appliances prior to restart.

GG. Furnish and install remote and self-contained refrigeration system complete with Copeland condensing unit and insulated copper refrigeration lines charged with R404A refrigerant.

Condensing unit shall be interconnected to a low profile, high velocity evaporator coil. Refrigeration system shall include all fittings, valves, switches, controls and all related components to comprise a complete operating unit of sufficient BTU capacity to maintain automatic operation of 35 degree F product temperature in coolers and -10 degree F product temperature in freezers. Refrigeration system provided with outdoor remote air cooled condensing unit shall be provided with winterized controls (low ambient package) including crankcase heater, line dryers and head pressure control unless specified as part of a pre-assembled refrigeration rack system. Refrigeration lines to be run within any slab or floor shall be either hard copper or soft copper if run within conduit.

HH. All electrical wiring, plumbing lines, gas lines (except exposed threaded pipe gas manifolds at cooking appliances), steam lines and refrigeration lines shall be concealed in the floor, walls or above the finished ceiling in an acceptable manner and in compliance with all applicable codes. Where it is impractical to run lines within the floor, walls or above the finished ceiling, lines shall be enclosed in a stainless steel (or alternate "smooth and cleanable" approved material) with appropriate access for service or replacement. In situations of an island arrangement or where equipment is not situated with access to a wall surface, lines must be installed in the floor in an approved manner including in-ground conduit for refrigeration and beverage lines. In no case shall any lines be "exposed".

II. Furnish materials and install all interconnecting wiring as required for the food service equipment, except for exhaust ventilation and fire suppression systems. This shall include inter-wiring of control panels furnished as a part of a fixture or appliance, on-off switches for light fixtures furnished as a part of a fixture or appliance, inter-wiring of control devices to motors furnished as a part of a fixture or appliance, time clock circuits for freezers from remote condensing unit to evaporator coil, heated pressure relief ports in walk-in freezer, electrical receptacles furnished as a part of a fixture or appliance, light fixtures in exhaust hoods and walk-in refrigeration to on-off switches and conduit junction boxes, ceiling mounted heat lamps to remote wall switch and inter-wiring of food waste disposer from control device to disposer motor as required to complete the installation of the food service equipment.

JJ. Furnish materials and install heat tracing tape to all condensate lines within walk-in freezer; insulate entire heat tracing tape with foam pipe insulation.

KK. Furnish materials and install all interconnecting plumbing as required for the food service equipment, except for exhaust ventilation and fire suppression systems. This shall include faucets, drains, drains with connected overflow, shut-off valves, vacuum breakers, flow or pressure control valves, gauges, bleeder tubes, piping from disposer control devise to disposer cone and disposer body inlets and piping for steam operated equipment from boiler take-off valve at steam generator to steam inlet connection at appliance as required to complete the installation of the food service equipment.

LL. Furnish materials and install insulated copper interconnecting piping between the dishmachine and the hot water booster heater, this shall include the installation of pressure and temperature gauges, strainer and shock absorber in the hot water supply line to the booster heater.

MM. Furnish materials and install insulated copper interconnecting piping between the dishmachine and the hot water booster heater, this shall include the installation of pressure and temperature gauges, strainer and shock absorber in the hot water supply line to the booster heater.

NN. Furnish and install water filter assemblies, sized and of the proper type to accommodate the water flow rate and "particulate" requirement of the food service equipment; this shall include all combi and bake ovens, steam cookers, proofing cabinets, ice makers, coffee brewing equipment and soda and beverage dispensing equipment.

OO. Furnish and install copper condensate lines in walk-in refrigeration from evaporator coil to waste receptor.

PP. Furnish and install gas supply shut-off valve at each gas manifold connection and furnish and install flexible gas hose connectors to each shut-off valve and to each cooking appliance.

QQ. Furnish materials and install interconnecting chrome plated exposed piping for hose reel and hose bibs including installation of check valves and vacuum breaker in supply line; this shall include chrome plated bleeder outlet if required by local health department regulations or local plumbing codes.

1.3 WORK BY THE ELECTRICAL TRADE

A. Rough-in utility connections including proper voltage, phase and amperage required to satisfactorily operate all items of food service equipment.

B. Final connection of the food service equipment from the rough-in location to the connection point on all food service equipment and necessary connection points.

C. All electrical components for the exhaust and supply ventilation system (including condensate hoods and pant leg vent systems) including, electrical disconnects, starters, exhaust fan on-off switch with indicator lights located in kitchen and supply fan controller with indicator lights located in kitchen and dishroom.

D. Furnishing and installation of all accessories, components and fixtures other than those specified as part of the food service equipment, to include but not be limited to, electrical circuit breakers or fuses, electrical receptacles, disconnect switches, on-off switches or other fittings and appurtenances that are required to connect the food service equipment in accordance with manufacturer's instructions and result in proper operation.

E. Utility disconnection and termination of discontinued services of existing food service equipment to be terminated.

F. Furnishing and installing electrical plug and cord sets where not furnished as part of the appliance.

G. Electrical contractors or shunt-trip circuit breakers to interrupt electrical power to all electrically operated food service cooking appliances.

H. In-floor, flush mounted, waterproof electrical receptacles of type and capacity to match plug and cord sets for all mobile food service counter equipment.

I. Ceiling mounted, retractable drop cords to accommodate food service equipment in an island arrangement, of the type and capacity to match plug and cord sets of the food service appliances.

J. Furnishing materials and installation of all interconnecting wiring as required for the food service exhaust ventilation and fire suppression systems; this shall include wiring of electrically operated gas supply shut-off valves for fire suppression systems, fire suppression system wiring to building fire alarm, heat detector electrical detection device to automatically start supply and exhaust fans and exhaust hood light fixtures to remote wall switch.

1.4 WORK BY THE PLUMBING TRADE

A. Rough-in utility connections including gas, steam, hot and cold water and floor receptors and drains in proper sizes, pressures and quantities required to satisfactorily operate all items of food service equipment.

B. Final connection of the food service equipment from the rough-in location to the connection point on all food service equipment and necessary outlets.

C. Furnishing and installation of all accessories, components and fixtures other than those specified as part of the food service equipment, to include but not be limited to stop cocks, traps, pipe, shut-off valves, pressure reducing valves or other fittings and appurtenances that are required to connect the food service equipment in accordance with manufacturer’s instructions and result in proper operation.

D. Furnishing and installing chrome plated indirect waste outlet piping for food service equipment, from the waste outlet connection on the food service equipment to the building waste receptacle (floor sink, etc.).

E. Flushing and sanitizing of lines before making final connections to the food service equipment.

F. Grease interceptors for food service equipment in capacity and size as required by code.

G. Furnish and install exposed threaded gas manifold piping for all cooking appliances and welded in-wall gas manifold piping.

H. Install gas shut-off valve supplied as part of the fire suppression system in the gas supply line in an exposed and accessible location.

1.5 WORK BY THE MECHANICAL TRADE

A. Supply and exhaust ventilation for indoor refrigeration condensing units based on 750 cfm for each air cooled compressor horsepower and 250 cfm for each water cooled compressor horsepower.

B. Exhaust ventilation for condensate applications including fully welded 18 gauge stainless steel or 12 gauge aluminum liquid tight ductwork pitched toward source to prevent leaking, fan and start-sop switch with indicator lights located in the dishroom.

C. Exhaust hood exhaust ventilation system including roof top mounted “utility set” type up-blast centrifugal fan with backward incline wheel, adjustable sheaves, vibration mounts and bird screen at discharge end; fan shall be rated at 14 sones or less and shall be UL 710 listed; roof curb, exhaust ductwork constructed of a minimum 16 gauge galvanized steel or 18 gauge stainless steel, fully welded liquid tight with clean-outs at every major bend and in 20 foot intervals; ductwork shall not exceed a three to one aspect ratio, connection to exhaust fan shall include a UL listed and rated vibration eliminator and ductwork shall be insulated with all prevailing codes.

D. Exhaust hood supply ventilation system including roof top mounted UL listed supply fan with vibration mounts, adjustable sheaves, roof curb, bird screen at intake end, maintainable filtration system, and gas or electric heated supply air heater (supply air heater heat incoming supply air below a 65 degree F ambient temperature) and 22 gauge galvanized steel ductwork.

E. Disconnection and termination of discontinued ductwork of existing exhaust or condensate hoods to be terminated or relocated, and modification or preparation of exhaust system for existing exhaust or condensate hoods to be relocated at the new location.

1.6 WORK BY THE CONSTRUCTION TRADE

A. Masonry bases, floor curbs, structural pads, floor depressions, roof curbs, flues and fireproof duct shafts or enclosures.

B. Conduit for beverage lines (PVC if embedded in concrete or smooth aluminum if exposed) with 24" radius sweep bends and 24" x 24" pull boxes every 100 lineal feet or three turns including sleeves any through walls, floors and ceilings.

C. Sleeves and openings through wall, floors and ceilings for passage of refrigeration lines.

D. Wall blocking or reinforcing to adequately support wall mounted food service equipment or fixtures; provide 3/4" thick exterior grade plywood backing for wood stud applications and 16 gauge steel backing for metal stud applications.

E. Stainless steel or FPR wall paneling behind all mop receptors, dishtables and pot / utensil washing sinks.

F. Installation of floor pans in floor depression with floor pans set flush and finished watertight around entire perimeter at juncture with floor surface.

G. Conduit for refrigeration lines (PVC if embedded in concrete or smooth aluminum if exposed) with 24" radius sweep bends including sleeves any through walls, floors and ceiling.

1.7 WORK BY THE ROOFING TRADE

A. Roof penetrations properly sealed and flashed to prevent water penetration.

1.8 BIDDING INSTRUCTIONS AND QUALIFICATION OF BIDDER

A. The primary items of food service equipment described in this specification are considered the basis of the bid. Only “equal” items listed as part of this specification will be considered and must meet the conditions of the base bid item; this shall include all materials and material finishes, fabrication methods, electrical, plumbing, and mechanical components, electrical control devices, hardware, accessories and options, exactly as specified without exception. It will be the full and complete responsibility of the Food Service Equipment Contractor to pay any and all costs incurred in adapting any other “equal” item to the mechanical, electrical, exhaust ventilation or structural systems of the building including any other cost increase incurred as a result of engineering changes to the mechanical, electrical, exhaust ventilation, architectural, structural or food service drawings. The contract is to be awarded as follows:

1. The competence and responsibility of the bidder.
2. An itemized cost breakdown of each scheduled item of food service equipment is required, as specified, in order that the District may, at his option, delete any item or supply any portion thereof, or increase the quantity of any item without affecting the cost quoted for the remaining items. “Pre-approved” substituted items must be submitted as an add or deduct alternate in addition to the base bid.
3. The District is not obligated to accept the lowest or any other bid. The award of the contract and choice of the food service equipment Contractor shall be at the District's discretion.

B. Each bidder shall be responsible to visit the project site of the proposed work and fully acquaint himself with conditions as they exist.

C. Each bidder is responsible to attend any pre-bid meeting as required by the District.

D. Each bidder shall be responsible to examine and review the contract document drawings and specifications. Should the bidder find during examination of the drawings and specifications any discrepancies, omissions, ambiguities, or conflicts in or among the contract documents or shall be in doubt as to their meaning, the District shall be notified no later than four working days prior to bid opening for clarification.

E. The failure or omission by any bidder to receive or examine any form, instrument or document or to visit the project site shall in no way relieve him from obligation with respect to his bid. No

claims for any extras will be allowed due to unintentional errors, conflicts, or omissions in the contract documents drawings or specifications.

1.9 SUBMITTALS

A. Product Data: For each buy-out item of food service equipment indicated. Include manufacturer's model number and accessories and requirements for access and maintenance clearances, water and drainage, power or fuel and service connections including roughing-in dimensions

B. Shop Drawings: For food service equipment not manufactured as standard production and catalog items by manufacturers. Shop drawings shall include the following information:

1. Dimensioned rough-in plans scaled at 1/4"=1'-0" accurately locating connection points and indicating utility data for all mechanical, electrical and supply and exhaust ventilation requirements.
2. Dimensioned plans scaled at ½"=1'-0" accurately locating and indicating the finished size of masonry bases, floor depressions in structural slabs, stub walls, curbs and finished openings for pass-thru equipment.
3. Dimensioned plans scaled at 1/4"=1'-0" accurately locating conduit and pull boxes for beverage and refrigeration lines including floor, wall and ceiling penetrations and termination points.
4. Dimensioned plans and detailed drawings of all custom fabricated food service equipment scaled at 3/4"-1'-0" for plan and elevation views and 1-½"=1'-0" for sectional views.

C. Copies of original maintenance and repair manuals including a list of all authorized service agencies responsible for each item of food service equipment.

1.10 QUALITY ASSURANCE

A. Manufacturer's qualifications shall include a firm that has regularly engaged in the manufacturing of food service equipment of the same type, capacity, performance and size as specified and whose products have been in similar service for not less than five years.

B. Custom fabricator qualifications for custom food service equipment shall include a skilled sheet metal shop with a minimum of five years' experience in custom sheet metal food service equipment fabrication of similar type as specified. All custom food service equipment shall be fabricated at the same shop.

C. Installer's qualifications shall include a firm with at least three years of successful installation experience on projects with a similar scope to that as required for this project.

D. Food service equipment dealers' qualifications shall include a firm which is regularly engaged in the purchasing of food service equipment as is a manufacturer authorized agent of the specified equipment for not less than five years. The dealer shall also employ a full time project

management staff to oversee the purchase of the equipment in compliance with the specifications, coordinate the form and fit of the equipment to the project site conditions, attend all project meetings, coordinate shop drawing review, coordinate installation with the Trades, coordinate factory training and address all issues as they relate to the satisfactory completion of the facility in compliance with the specifications and related documentation.

E. Codes and Standards: All food service equipment furnished and installed under this specification shall be manufactured in strict compliance with the following publications or the current or revised related publication as well as all state, national and local codes and agencies having jurisdiction over same:

1. National Electrical Manufacturer Association NEMA
    a. ICS-77 Industrial Controls and Systems
2. National Electrical Manufacturer Association NEMA
    a. ICS-77 Industrial Controls and Systems
    b. 17.4 Local Application System
    c. 17.13 Water Sprinkler Systems
    d. 96-76 Installation of Equipment for the Removal of Smoke and Grease Laden Vapors for Commercial Cooking Equipment
3. National Sanitation Foundation NSF
    a. 11 76 Food Service Equipment
    b. 4 73 Commercial Cooking and Warming Equipment
    c. C-2-72 Special Equipment and/or Devices
4. National Electrical Manufacturer Association NEMA
    a. 57-78 Electric Lighting Fixtures
    b. 197-78 Commercial Electric Cooking Appliances
    c. 300 Fire Extinguishing Systems

F. All food service equipment shall be manufactured in strict compliance with standards as set forth by the National Sanitation Foundation (NSF) including fabrication of custom built equipment and shall be listed with same and shall bear their seal. Any item of food service equipment lacking the NSF seal will be rejected.

G. All electrically operated food service equipment shall be constructed in strict compliance with standards as set forth by the Underwriters Laboratories (UL) and shall utilize approved components and assemblies and shall bear the label thereof.

H. Custom fabricated food service equipment shall be constructed to the standards as set forth by the National Association of Food Equipment Manufacturers (NAFEM).

I. All refrigeration equipment and all pressurized vessels shall be constructed, approved, inspected, registered and stamped and installed in strict compliance with the American Society of Mechanical Engineers (ASME), state and local codes for Unfired Pressure Vessels and all other agencies having jurisdiction thereof.

J. All gas operated food service equipment shall be fabricated in strict compliance with standards as set forth by the Underwriter Laboratory (UL) and shall be listed with same and shall bear their seal.

K. Steam operated equipment shall be fabricated and installed in accordance with Pennsylvania Department of Labor and Industry standards.

L. Product Options: Drawings indicate food service equipment based on the specific products indicated. Other manufacturers' equipment with equivalent size and performance characteristics may be considered.

M. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings." Review methods and procedures related to food service equipment including, but not limited to the following:

1. Review access requirements for equipment delivery.
2. Review equipment storage and security requirements.
3. Inspect and discuss condition of substrate and other preparatory work performed by other Trades.
4. Review structural loading limitations.
5. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.

1.11 DELIVERY, STORAGE AND HANDLING

A. Deliver food service equipment as factory-assembled units with protective crating and covering.

B. Store food service equipment in original protective crating and covering and in a dry location.

1.12 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions of food service equipment installation areas by field measurements before equipment fabrication and indicate measurements on Shop Drawings and Coordination Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.13 COORDINATION

A. Coordinate equipment layout and installation with other work including light fixtures, HVAC equipment and fire-suppression system components.

B. Coordinate location and requirements of service-utility connections.

C. Coordinate size, location and requirements of concrete bases, positive slopes to drains, floor depressions and insulated floors. Concrete, reinforcement and formwork requirements are specified in Division 3 Section "Cast-in-Place Concrete".

D. Coordinate installation of roof curbs, equipment supports and roof penetrations, as specified in Division 7 Section "Roof Accessories".

1.14 WARRANTIES

A. General Warranty: The special warranty specified in this Article shall not deprive the District of other rights the District may have under other provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

B. All buy-out food service equipment herein specified shall have all parts and labor warranted in writing, from the date of Final Acceptance by the District against defective parts, materials, workmanship and design for a period of time as stated within the manufacturers standard published warranty, but no less than two years.

C. All custom fabricated food service equipment shall be warranted as stated above except for a period of two years.

D. Refrigeration equipment shall include start-up and two year parts and labor warranty on the entire refrigeration system and manufacturers five year parts warranty on hermetic scroll and semi-hermetic sealed compressors.

E. Existing equipment refurbished for reuse shall be warranted in writing, against defective parts, materials and labor as stated above but for a period of 90 days.

PART 2 - PRODUCTS

2.1 MATERIALS AND WORKMANSHIP

A. Stainless steel shall be type 302 or type 304 extra low carbon non-magnetic austenitic 18% chrome, 8% nickel alloy steel. Gauges shall be U.S. Standard of Thickness set forth below:

GAUGE	THICKNESS	GAUGE	THICKNESS
10	.1346	16	.0598
11	.1196	18	.0478
12	.1046	20	.0359
14	.0747	22	.0299

B. All sheets shall be of maximum length to permit fabrication from one sheet. All thickness must meet the above gauge thickness within tolerances set forth by the ANSI after polishing. Finished sheets exceeding these tolerances shall be rejected as not meeting this Specification.

C. Galvanealled steel shall be ARMCO steel or an approved grade of copper bearing steel shall be properly primed, degreased and finished with two coats of synthetic aluminum bronze.

D. Structural steel members used for framing, consisting of angles, bands, bars and channels shall be ductile in quality, free of hard spots, runs, checks, cracks and other surface defects and shall be smooth galvanized by the hot dip process with all surplus removed, free of runs, blisters, excess splatter and uncoated spots or patches.

E. White metal shall consist of corrosion resistant metal containing not less than 21% nickel. All castings shall be rough ground, polished and buffed to a bright luster and shall be free from pit marks, runs, checks, burrs and other imperfections.

F. Stainless steel pipe and tubing shall be seamless or welded of gauge specified and of true roundness. Seamless tubing shall be thoroughly and correctly annealed and ground smooth. Welded tubing shall be thoroughly heat treated and properly quenched to eliminate carbide precipitation, drawn true to size and roundness and polished to match stainless steel sheets.

G. Welding shall be of the electric submerged or concealed arc type, heliarc wherever practical. Where welding rods are required they shall be of the same composition as materials to be joined coated with a non-carbonaceous flux.

H. Plastic Laminate: Complying with NEMA LD 3 and NSF 35 requirements; NSF certified for end-use application indicated; 0.050 inch (1.27 mm) thick, smooth texture and easily cleanable.

1. Color: As selected by Architect from manufacturer’s full range of colors.

I. Plywood and Lumber: Close grain exterior grade mahogany or birch plywood.

J. Sealant: ASTM C 920; Type S, Grade NS, Class 25, Use NT. Provide elastomeric sealant NSF certified for end-use application indicated. Provide sealant that when cured and washed meets requirements of Food and Drug Administration’s 21 CFR, Section 177.2600 for use in areas that come in contact with food.

1. Color: As selected by Architect from manufacturer’s full range of colors.
2. Backer Rod: Closed-cell polyethylene in diameter larger than joint width.

K. Plastic: Except for plastic laminate, provide plastic materials and components complying with NSF 51.

L. Sound Dampening: NSF-certified, non-absorbent, hard drying, sound-deadening coating. Provide coating compounded for permanent adhesion to metal in 1/8-inch (3-mm) thickness that does not chip, flake or blister.

M. Gaskets: NSF certified for end-use application indicated; of resilient rubber, neoprene or PVC that is nontoxic, stable, odorless, nonabsorbent and unaffected by exposure to foods and cleaning compounds.

2.2 ACCESSORIES

A. Cabinet Hardware: Provide NSF-certified stainless steel hardware for equipment items as indicated.

B. Casters: NSF-certified standard-duty stainless-steel swivel stem casters with 5-inch (125-mm) diameter wheels, polyurethane tires with 1-inch (25-mm) tread width and 300-lb (90-kg) load capacity per caster. Provide brakes on 2 casters per unit.

2.3 FABRICATION, GENERAL

A. All welds shall be strong and ductile, nonporous, free of pits and cracks. Parts which are to be welded shall be homogeneous, of a like color and finish to adjoining material. Excess metal and carbide precipitation shall be ground off, finished smooth and polished. Unexposed welds shall be pacified to prevent attrition. Brazed or soldered joints are unacceptable. Where galvanizing has been damaged due to the welding or grinding process, these areas shall be galvawelded to replace finish

B. All exposed surfaces of the food service equipment shall be free from bolts, screws and rivet fastenings. Wherever bolts are required they shall be of similar composition and finish as the metal to which they are applied.

C. Wherever practical all food service equipment and fixtures shall be factory or shop fabricated of one-piece construction, shipped to the project site as one unit completely assembled.

D. Items of food service equipment or fixtures too large to enter or transverse the building to the installation location in one assembly shall be constructed in sections and shall be furnished with field joints. Where field joints are necessary, all adjoining exposed surfaces shall be field welded at the project site as specified above for welding. Where conditions make welded field joints impractical, each sub-assembly shall be fabricated with off-set draw angles welded to the underside of each adjoining top surface and drawn together to a “hairline” seam with 1/4"-20 stainless steel bolts with lock washers and chrome plated acorn nuts. Bolted field joints will be permitted only where specifically shown on Drawings or specified for a particular item.

E. Wherever shear edges occur they shall be free of burrs, fins or irregular projections and shall be finished to prevent cutting or laceration when the hand is drawn over such shear edges. Brake bends shall be free of undue and where such bends do mar the uniform surface appearance of the material, such marks shall be removed by suitable grinding, polishing and finishing. In no case where miters or bullnose corners occur is overlapping materials acceptable.

2.4 GENERAL FRABRICATION STANDARDS

A. TOPS:

1. Tops shall be fabricated of 14 gauge stainless steel unless otherwise specified. All edges shall be bullnose or formed as specified with all joints butt-edged and electrically welded,

ground smooth and polished so no evidence of welding will appear. Soldered corners to achieve round corner construction will not be accepted.

2. Tops adjacent to walls, columns or other equipment shall be turned up integrally into a backsplash as specified. All interior corners shall be coved on a ¾" radius, both horizontally and vertically, forming spherical corners. Ends of backsplashes shall be fully enclosed to the low point of the top edge, fully welded, ground smooth and polished.

B. SUPPORT FRAMING

1. Around the entire perimeter on the underside of all tops and set back 1" from the down-turned edge shall be a fully welded frame assembly fabricated of 1-1/2" x 1-1/2" x 1/8" stainless steel angle iron or material as specified. Provide intermediate cross bracing fabricated of the same material as the angle framing and fully weld to perimeter frame on centers not to exceed 24". Tack weld the entire frame assembly to the underside of the top surface.
2. Open base tables shall be provided with leg mounting channels for weld anchoring leg gussets and shall be fabricated of 1" x 4" x 1" 12 gauge stainless steel or material as specified fully welded at each end of frame and at intervals not to exceed 6'-0".
3. Cabinet base tables and counters shall be provided with triangular corner gusset plates for weld anchoring counter type legs and shall be fabricated of 12 gauge stainless steel fully welded at each corner of table or counter body and at intervals not to exceed 6'-0".
4. Freestanding sinks and Bain Maries shall be provided with triangular corner gusset plates for weld anchoring leg gussets and shall be fabricated of 12 gauge stainless steel, fully welded at each corner of sink or Bain Marie bottom and at intervals not to exceed 6'-0".

C. LEGS AND ADJUSTABLE BULLET FEET

1. Legs shall be constructed of 1-5/8" diameter 16 gauge stainless steel tubing. Each leg shall be swaged and tapered at the bottom. Fasten each leg to a 3-1/2" high conical shaped die-formed stainless steel gusset equivalent to Component Hardware A20-0206. Provide each leg with stainless steel adjustable foot insert equivalent to Component Hardware A10-0852.
2. Cabinet base tables and counters shall be provided with 6" high conical shaped die-formed stainless steel equipment leg with stainless steel adjustable round foot insert equivalent to Component Hardware A72-0811.

D. CROSSRAILS

1. Provide all open base tables and freestanding sinks and bain Maries with 1-1/4" diameter 16 gauge stainless steel tubular cross railing running between legs at a point 10" above the finished floor. Cross railing shall be continuously welded to legs, filleted, ground smooth and polished to provide a smooth coved radius with leg surface.
2. Where cross railing abuts cabinet base fixtures, cross railing shall be concealed bolt anchored to same utilizing stainless steel hardware.

E. UNDERSHELVES

1. Provide solid fixed undershelf, constructed of 16 gauge stainless steel. Front edge shall be turned down 1" at 90 degrees and returned ½" at 45 degrees. Rear and ends shall be turned up 2" high on a 90 degree angle, interior corners coved on ¾" radius.

F. DRAWERS

1. Provide drawer pan constructed of 14 gauge stainless steel with inside corners coved on a 3/4" radius. Drawer front face shall be double pan type constructed of 16 gauge stainless steel with inner pan set into outer pan and welded in place. Drawer front shall be set into and shall be removable from a 14 gauge stainless steel, channel shaped drawer cradle. Drawer suspension slides shall be secured to drawer frame assembly and shall be Component Hardware S52 series full extension type with 14 gauge stainless steel slides with stainless steel ball bearing wheels having a load capacity of 200 pounds. Provide hard rubber bumper drawer stops. Drawer suspension guides shall be fastened to 18 gauge stainless steel housing which is suspended from the angle framing under the table top. Provide drawer fronts with full grip recessed stainless steel flush pull handles.
2. Stainless steel drawer enclosure cabinet with quantity of drawers as specified with cabinet body fabricated of 18 gauge stainless steel, wrap around construction. The backs of front stiles shall be closed with tight fitting channel sections of 18 gauge stainless steel, welded in place, and closed on top and bottom. Drawer suspension slides shall be secured to drawer frame assembly and shall be Component Hardware S52 series full extension type with 14 gauge stainless steel slides with stainless steel ball bearing wheels having a load capacity of 200 pounds. Provide hard rubber bumper drawer stops. Provide drawer fronts with full grip recessed stainless steel flush pull handles.

G. CABINET BASES

1. Cabinet body shall be fabricated of 18 gauge stainless steel wrap around construction. The backs of front stiles shall be closed with tight fitting channel sections of 18 gauge stainless steel, welded in place and closed on top and bottom.
2. Cabinet base shelves shall be fixed bottom and intermediate fabricated of 18 gauge stainless steel. Front edge shall be turned down 1 1/2" at 90 degrees, returned 1/2" at 90 degrees. Rear and ends shall be turned up 2" at 90 degrees with interior corners coved on a ¾" radius. Shelf shall be weld anchored to cabinet body. Bottom shelf shall be fabricated flush with front mullions with fully welded facing junctures presenting seamless construction. Fixed intermediate shelves shall be designed similar to bottom shelf except front edge shall be set behind vertical mullions and fully welded thereto.

H. SLIDING DOORS

1. Sliding doors shall be double pan type constructed of 16 gauge stainless steel with inner pan set into outer pan and welded in place. Doors shall have welded internally 1" x 4" x 1" 14 gauge stainless steel hat type reinforcing channels. Doors shall be fitted with full grip, recessed type stainless steel flush pull handles. Provide 16 gauge stainless steel angle door stops welded to door. Provide hard rubber door stops. Provide each door with two, 1 3/8" diameter stainless steel ball bearing sheaves fastened to 1" x 1/8" thick stainless steel bar stock hangers welded to top corners of each door for suspending on overhead door channel track. Provide hangers with stainless steel removable locks to

prevent doors from jumping track during operation while permitting ease of removal. Fabricate overhead track of 14 gauge stainless steel and weld to cabinet body. Provide bottom of doors with nylon door guides secured to bottom shelf. Guides shall not interfere with door removal.

I. HINGED DOORS

1. Hinged doors shall be double pan type constructed of 16 gauge stainless steel with inner pan set into outer pan and welded in place. Hinges shall be stainless steel cam action pin type fastened by means of counter sunk flat head stainless steel screws staggered on centers and tapped into 1/4" thick stainless steel bar stock welded behind door jamb. Doors shall be removable from hinges without the use of tools. Doors shall be held closed by permanent magnet closure devices. Doors shall be fitted with a full grip recessed type stainless steel flush pull handles. Provide hard rubber door stop bumpers.

J. SINKS

1. Sinks shall be fabricated of 14 gauge stainless steel with all interior corners coved on a ¾” radius both horizontally and vertically forming spherical corners.
2. Exposed edges of sink shall be finished with a 1 ½" diameter 180 degree rolled edge, rear and sides adjacent to adjoining surfaces shall have a backsplash turned up 10" high at a 90 degree angle on a ¾” radius and turned back 2 ½" on a 45 degree angle, then down ½" at 90 degrees along back.
3. Multiple sink compartments shall be divided with double wall 14 gauge stainless steel partitions 1" wide rounded on top and all corners at a ¾” radius. Finish bottom, back and front with 14 gauge stainless steel to form one continuous sink with no overlapping joints or open spaces between sink compartments.
4. Integral drainboards shall be constructed of 14 gauge stainless steel. The front portion shall continue the 1 ½" diameter 180 degree rolled rim of the sink bowl on a continuous level horizontal plane. The surface of the drainboard shall be pitched from 2 ½" at the end away from the sink to 3" at the sink bowl. Sink and drainboard backsplash shall be continuous and level on the horizontal plane. All interior corners both vertical and horizontal shall be coved on a ¾” radius. Drainboards shall be reinforced with 1" x 4" x 1", 12 gauge stainless steel “hat” channels extending front to rear tack welded to underside of drainboard for weld anchoring leg gussets.
5. Provide crossrails extending front to rear between legs, crossrails shall not extend along rear at sink to prevent interference with plumbing.
6. Built-in sink compartments shall be fabricated as an integral part of fixture with sink fully welded with adjacent top, weld ground smooth and polished.

K. MILLWORK

1. Millwork fabricator shop shall be a certified participant in AWI’s Quality Certification Program (QCP) to standard “Premium” construction.
2. Tops shall be fabricated of 3/4" thick 5-7 ply BW marine grade plywood build up to a 1 ½” thickness. All plastic laminate finished edges shall be applied prior to the surface laminate. Provide cross bracing around entire perimeter below tops and above all interior dividers to minimize deflection from equipment. Tops shall be fabricated in sections as

large as possible to minimize field seams. Field seams shall be assembled utilizing TB-2 yellow glue. The bottom surfaces of all tops must be sealed with gray cabinet liner to comply with Board of Health requirements. Cut-outs for drop-in equipment shall be cut in the shop and with all edges sealed. All drop-in equipment shall be pre-fitted in top prior to delivery to the job site. All drop-in equipment shall be sealed with General Electric or equivalent clear silicon sealer after installation. Hardwood edges shall be applied prior to surface laminate. All hardwood to match for color and grain. Edges to be chamfered and finished as specified. Solid surface tops shall receive full plywood substrate with 3/4" x 3" batons for proper air space. All tops shall be prepared for installation of sneeze guards including additional blocking and / or cutouts.

3. All cabinet base and interiors shall be fabricated of 3/4" thick 5-7 ply marine grade plywood with high-pressure laminate finish. Recessed toe base shall be 6" high fabricated of 3/4" thick 5-7 ply marine grade plywood with 16 gauge stainless steel finish. Shelf pilasters to be recessed type 250WH with 253WH locking clips. Cabinet backs shall be fabricated of 1/4" thick MELA-MDF board. Cabinet ends to be dadoed for back and bottom and notched to receive aprons and kicks. Butt or dowel construction will not be acceptable. Cabinets shall be assembled with TB-2 yellow glue with screws and staples. Cabinets with finished backs shall be fabricated of 3/4" thick 5-7 marine grade plywood with high-pressure laminate finish. Cabinets over 48" in length shall have interior dividers. Dividers shall be dadoed into the bottom and notched for aprons. Dividers shall be notched as required for equipment. Aprons shall be large enough to conceal drop-in equipment and also to house control panels. Cabinet bases shall be fabricated in sections as large as possible to minimize field seams.
4. Doors shall be fabricated of 3/4" thick MDF board with high-pressure laminate finish and shall be furnished with three BLUM 75M5580 or 75M5680 European style concealed hinges. Door pulls shall be Hafele 116.39.437. Locks where required shall be cam style, keyed alike. Doors shall not exceed 27" in width and shall be of equal size.
5. Drawers shall be constructed of 3/8" thick birchwood with dove tail joinery. Drawer slides shall be Accuride 150 lb. full extension type with stainless steel ball bearing hardware.
6. Applied wood fascia panels and doors shall be stile and rail design. Panels to be recessed or raised as specified. All wood to be select for color and grain. Finish shall match stock color samples or custom to match furnished sample. All panels and doors to be equally sized per cabinet. Provide full wood louvered panels as required for equipment requiring air circulation. Finish all wood with stain followed by single coat of sealer. After sealer, apply one layer of Armourcote conversion varnish approved for use in food service with 55% gloss.

L. SOLID AND HARD SURFACE MATERIAL ("CORIAN" / "ZODIAK")

1. Provide counter top, tray slide, etc. of approved solid surface material. Material shall be fabricated and assembled per manufacturers approved methods utilizing a factory authorized and certified fabricator and installer. The edges of the top shall be formed as indicated on the food service and architectural detail drawings, routed and finished as directed. Openings shall have radius corners and shall be reinforced with additional material. Where drop-in appliances are to set on tops, the fixture shall be furnished with a ¾" thick marine grade plywood sub-top fabricated with a perimeter frame extending through the opening in the top preventing the appliance from setting directly on the solid

surface material and allowing the sub-top to distribute the weight of the appliance. Where heated appliances are to set on the top the sub-top is to be fabricated as above to prevent heat from being in direct contact with the solid surface top; additional fiberboard insulation material is to be provided where transfer of radiated heat will contact any solid surface material

M. PAINTING

1. Galvanized steel shall be cleaned and degreased with mineral spirits, primed with a minimum of two coats of primer and spray finished with a minimum of two coats of gray epoxy enamel paint

N. LAMINATED PLASTIC

1. All exposed surfaces shall be faced with 1/16" thick high pressure plastic laminate in color and pattern as specified.
2. All unexposed surfaces shall be faced with .020 or .030 gray thermoset decorative overlay.
3. Where the plastic laminate is to be bonded to removable or fixed panels the panels shall be fabricated of 3/4" thick close grain marine grade mahogany or birch plywood with surfaces bonded with waterproof glue.
4. Where the plastic laminate is to be bonded directly to the metal facing of a cabinet base table or counter, surfaces shall be bonded with contact adhesive.

O. CLOSURE TRIM

1. Provide closure trim pieces fabricated of 16 gauge stainless steel or of material and finish as specified, trim shall be one piece constructions furnished to seal both horizontal and vertical junctures and openings

2.5 STAINLESS STEEL FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal products" for recommendations relative to applying and designating finishes.

1. Remove or blend tool and die marks and stretch lines into finish.
2. Grind and polish surfaces to produce uniform directional textured polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

B. Concealed Surfaces: Minimum of 80 grit finish.

C. Exposed Surfaces: No. 4 finish (bright, directional polish) of 180 grit.

D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

E. Protect mechanical finishes on exposed surfaces from damage by applying a strippable temporary protective covering before shipment.

2.6 STANDARDS FOR EXISTING EQUIPMENT

A. The food service equipment contractor shall examine each item of food service equipment specified as existing to be reused prior to his submission of his bid to ascertain proper fit and alignment in its proposed location, inspect for any physical damage and to determine the present operational performance and condition of each item or any component thereof and submit to the Owner as part of his bid the extent of repairs or replacement parts, required to recondition the entire unit for satisfactory operation.

B. The food service equipment contractor shall disassemble each existing item to be reused, clean, service and recondition including any transport for reconditioning if required at any service agency or shop, redeliver or relocate at the project site to the new location, set-in-place, align and secure in its new location and assemble any fixtures, components and sub-assemblies, left ready for final utility connections by the Trades.

1. Cleaning of the food service equipment shall include a thorough scrapping and steam cleaning to remove scale and all foreign material.
2. Repainting of all fabricated and buy-out items having worn or scarred exposed surfaces that are not stainless steel materials. Repainting shall be a minimum of two coats of original paint or touched-up as required.
3. Repair any damage incurred during relocation or transit such as dents, cracks or broken welds.
4. Replacement of door gaskets and seals and realignment for proper operation.
5. Replace non-functioning condensate evaporators in refrigerators.
6. Replacement of broken door hinges, drawer slide assemblies, door and drawer handles, door pans or lock assemblies.
7. Servicing and cleaning of all condensing units, (vacuum and comb), evaporator coils, expansion valves, etc. setting and adjusting of all temperature controls to maintain normal operating temperature and charging of the refrigeration system with proper refrigerant. Refrigeration systems to be re-used shall be recharged with proper refrigerant or converted to an acceptable code compliant refrigerant.
8. Replace or repair all plumbing components as required including faucets and waste outlets with fixtures of similar type and manufacturer.
9. Pump-down of all refrigeration systems to be discontinued or relocated and re-claiming and disposal of all refrigerant and toxic materials as necessary.

C. The following work shall be included as part of this contract on specified items or as required by the Owner or as determined or recommended as necessary during the site inspection.

1. Repair or replacement of all materials or parts to correct any gas, steam or electrically operated cooking appliance including power generation devices such as boilers and related mechanical and electrical heating and control components and devices.
2. Remove, sharpen and reinstall all cutting blades on all cutting machinery including slicers, food cutters and food choppers.

3. Recondition and lubricate electric motors and transmission devices, replacing worn or damaged gears, drive belts, etc. and repacking or replacing oil with proper type as recommended by the manufacturer.
4. Inspecting, cleaning and upgrading of exhaust ventilation systems including fire protection systems and components. Exhaust hood shall be steam cleaned and chemically treated to remove all traces of grease and foreign material, painted exhaust hoods shall be primed and repainted with a minimum of two coats of primer and fire resistant paint, filters shall be replaced with grease extractor type filters to match design air volume requirements and fusible links shall be replaced with proper heat values. Fire system shall be inspected and recharged to full operational condition. Fire system nozzles and related piping and fittings shall be relocated and reworked to accommodate the new equipment arrangement with nozzle heads replaced as required. All ductwork shall be inspected to assure compliance with present codes and statutes with all ductwork thoroughly cleaned. Air movement shall be measured for proper air quantities and velocities and conditions corrected to meet proper requirements. All conditions of the existing exhaust ventilation and fire protection system shall be in compliance with all current prevailing codes, statutes and NFPA requirements.

D. All nameplates are to be left completely legible.

E. Existing equipment to be reused shall have all utilities disconnected, terminated, or capped-off by the Plumbing, Electrical and Mechanical (HVAC) Trades.

F. Plumbing, Electrical and Mechanical (HVAC) Trades shall provide all mechanical, electrical and HVAC services as required and provide final connection to same at the new site location.

G. Final determination and verification of Plumbing, Electrical and Mechanical (HVAC) requirements for all existing food service equipment to be reused is the responsibility of the Mechanical and Electrical Engineer. Provisions for relocated utility requirements shall conform to current codes and statutes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions with Installer for compliance with requirements for installation tolerances, service-utility connections and other conditions affecting installation and performance of food service equipment. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Examine roughing-in for piping, mechanical and electrical systems to verify actual locations of connections before installation

3.2 INSTALLATION

A. Set each item of fixed food service equipment securely in place, level and adjust to correct height. Anchor to supporting surface where required for sustained operation and use without shifting or dislocation. Provide concealed anchoring where possible. Adjust work surfaces to a level tolerance of 1/16" maximum offset and slope drainage surfaces at 1/16" per foot.

B. Complete field assembly of field joints by welding or bolting utilizing the method as indicated with the fixture. Grind all field welds smooth and polish. Set and trim all gaskets to be installed as part of field assembly.

C. Treat enclosed spaces that are inaccessible after food service equipment installation by covering all horizontal surfaces with powdered borax at a rate of 4 ounces per square foot.

D. Provide closure trim pieces fabricated of 16 gauge stainless steel or of material and finish as specified, trim shall be one piece construction furnished to seal both horizontal and vertical junctures and openings where the conditions given below occur:

1. Food service equipment is installed into wall openings. Trim shall apply to both sides of wall opening with all corners fully welded, ground smooth and polished.
2. Two or more items of food service equipment are butted together.
3. Food service equipment is installed against wall, columns other equipment resulting in a gap or juncture exceeding 1/4" in width.
4. An open gap of any size between the juncture or joint between adjoining items of food service equipment, wall or column surfaces which might result in the penetration or collection of grease or vermin.

E. Provide cut-outs and openings in food service equipment as required to extend plumbing, electric, steam or gas lines through the food service equipment either for interconnection of utility lines or final connection.

F. Seal around each item of food service equipment with sealant for gaps or spaces less than 1/4" in width and with stainless steel trim for gaps or spaces exceeding 1/4" in width. Closure strips shall conform to the shape and size of the surfaces or juncture to be sealed and shall be neatly scribed for a tight fit.

3.3 PROTECTION AND CLEANING

A. Provide final protection and maintain conditions in a manner acceptable to District, Manufacturer and Installer that ensure food service equipment is without damage or deterioration at the time of Substantial Completion.

B. After completion of the food service equipment installation and completion of other major work in the food service area remove protective coverings and clean and sanitize all food service equipment both internally and externally. Restore exposed and semi-exposed finished to remove abrasions or other surface damage, polish exposed metal surfaces and touch-up painted surfaces. Replace work which cannot be successfully restored.

3.4 COMMISIONING

A. Delay start-up of the food service equipment until utility services have been installed, completed and tested, balanced and adjusted for pressure and voltage, and until water and steam lines have been treated and cleaned for sanitation. Before start-up of the food service equipment lubricate in accordance with manufacturer's instructions.

1. Coordinate food service equipment startup with service-utility testing, balancing and adjustments. Do not operate steam lines before they have been cleaned and sanitized.

B. Provide on-site demonstration and formal technical training by the manufacturer's technical representative for each item of food service equipment as required to instruct the District and its personnel in the safe operation and sanitation and maintenance of the food service equipment.

C. Test each item of food service equipment for proper operation.

1. Repair or replace equipment that is defective in operation including units that operate below required capacity or that operate with excessive noise or vibration.
2. Test refrigeration equipment's ability to maintain specified operating temperature under heavy-use conditions. Repair or replace equipment that does not maintain specified operating temperature.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
4. Test motors and rotating equipment for proper rotation and lubricate moving parts according to manufacturer's written instructions.
5. Test water, drain, gas, steam, oil, refrigerant and liquid-carrying components for leaks. Repair or replace leaking components.
6. Train District's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing and preventive maintenance for each food service equipment item.
7. Review data in the operation and maintenance manuals. Refer to Division 1 Section "Contract Closeout".
8. Review data in the operation and maintenance manuals. Refer to Division 1 Section "Operation and Maintenance Data".
9. Schedule training with District through Construction Manager with at least seven days advance notice.

3.5 SCHEDULE OF EQUIPMENT

A. Equipment Schedule: Refer to all Contract Documents pertaining to the food service areas. Equipment itemized along with brands and model numbers and salient features establish the standard for construction, operation and engineering criteria.

B. Equipment indicated below is intended to establish the standard of quality of the food service equipment. Alternate "Equal" products by other manufacturers may be considered if equivalent in design, performance, durability and function.

c. This document is the intellectual property of Corsi Associates and as such use by any other entity is prohibited.

ITEM #01 WALK-IN COOLER
Quantity: One (1)
Manufacturer: American Panel / Norbec / Arctic
Model: Size and shape as per plan
Construction: Furnish and erect, compartment, sectional, urethane insulated walk-in cooler assembly.

Walk-in assembly shall bear the UL label and NSF and Factory Mutual seals and shall meet 2009 Federal Regulations.

Ceiling and wall panels shall be constructed of 4" thick urethane insulation, assembly to be accomplished by the use of integral cam type locking device, secured in place during the foaming process. Seams between panels shall be insulated with vinyl foamed in place gasket material.

Ceiling and wall panels shall be finished of 18 gauge embossed aluminum on interior and exterior surfaces.

Walk-in assembly shall be provided with 1/8” thick aluminum diamond tread plate floor with NSF approved coved corners, insulated with 4" thick urethane insulation and reinforced with ¾” thick 5-7 ply marine grade plywood underlayment. Floor installation shall be in accordance with manufacturers recommended practice and shall sit in building floor depression with adjacent kitchen floor material finish in walk-in, set flush with kitchen floor and furnished with recessed channel in building floor for thresh hold cap.

Construction Trade shall furnish and install floor depression and finished floor within walk-in assembly. Pitch floor within walk-in towards entrance door at 1/8" per foot minimum.

Walk-in assembly shall be furnished with in-fitting type door and frame assemblies constructed of 16 gauge stainless steel provided with three self-closing cam action chrome plated hinge assemblies, handles and hardware.

Provide door with 2" dial type flush mount thermometer with chrome plated bezel mounted in door frame.

Provide door with triple pane observation and 36” high 3/16" thick aluminum diamond tread kick plate on both interior and exterior side.

Provide door with UL listed, vapor proof LED light fixture complete with toggle switch and pilot light and full perimeter frame condensation heater.

Provide a total of four (4) U.L. listed, vapor proof LED ceiling mounted light fixture complete with stainless steel mounting hardware.

Foodservice Equipment Contractor shall install ceiling mounted light fixtures and furnish materials and inter-wire light fixtures and switch.

Furnish and install 18 gauge embossed aluminum vertical trim angles and ceiling closure panels.

Furnish and install entire refrigeration system complete with Copeland semi-hermetic condensing units and insulated copper refrigeration lines charged with R404A refrigerant. Each condensing unit shall be interconnected to a low profile, high velocity evaporator coil in each walk-in compartment. Refrigeration system shall include all fittings, valves, switches, controls and all related components to comprise a complete operating unit of sufficient BTU capacity to maintain automatic operation of 35 degree F product temperature in cooler.

Refrigeration system shall be provided with outdoor remote air cooled condensing units with each condensing unit to be located on the building roof.

Condensing units shall be provided with winterized controls (low ambient package), including crankcase heater, line dryer, head pressure control and galvanized steel stand with stainless steel weather hood.

Provide all hangers and brackets as required to install refrigeration lines.

Construction Trade shall furnish all sleeves and openings through walls, ceiling and floor for passage of refrigeration lines. Furnish galvanized steel stand.

Mechanical (HVAC) Trade shall provide exhaust ventilation for indoor condensing units based on 750 CFM exhaust for compressor horsepower for air cooled condensing units.

Foodservice Equipment Contractor shall furnish and install copper tubing and extend evaporator coil condensate line to floor receptacle.

Set and adjust all temperature and defrost cycles.

Provide start-up and two year material and labor warranty on entire refrigeration system, and five years manufacturer’s warranty on compressor.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #02	EVAPORATOR, WALK-IN COOLER
Quantity:	One (1)
Manufacturer:	American Panel / Norbec / Arctic
Model:	BEL0105BS6AM

Remarks:	Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #03	CONDENSING UNIT, WALK-IN COOLER
Quantity:	One (1)
Manufacturer:	American Panel / Norbec / Arctic
Model:	FFAM-A17Z-TFC-075
Remarks:	Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #04	WIRE SHELVING
Quantity:	Fifty-One (51)
Manufacturer:	Metro / Eagle group / Quantum
Model:	PR2454NK3 (204)
Options:	70UPK3 Posts (204) 5MP Casters (102) 5MPB Casters (102)
Sup Info:	Assemble into four tier shelving units, locate bottom shelf 12” above floor.

ITEM #05	WIRE SHELVING
Quantity:	Twenty (20)
Manufacturer:	Metro / Eagle group / Quantum
Model:	PR2430NK3 (80)
Options:	70UPK3 Posts (80) 5MP Casters (40) 5MPB Casters (40)
Sup Info:	Assemble into four tier shelving units, locate bottom shelf 12” above floor.

ITEM #06	WIRE SHELVING
Quantity:	Three (3)
Manufacturer:	Metro / Eagle group / Quantum
Model:	PR2454NK3 (15)
Options:	74UPK3 Posts (12) 5MP Casters (16) 5MPB Casters (16)
Sup Info:	Assemble into five tier shelving units, locate bottom shelf 12” above floor.

ITEM #07	WIRE SHELVING
Quantity:	Four (4)
Manufacturer:	Metro / Eagle group / Quantum
Model:	PR2442NK3 (20)
Options:	74UPK3 Posts (16) 5MP Casters (8) 5MPB Casters (8)
Sup Info:	Assemble into five tier shelving units, locate bottom shelf 12” above floor.

ITEM #08	WIRE SHELVING
Quantity:	Twelve (12)

Manufacturer:	Metro / Eagle group / Quantum
Model:	PR2460NK3 (60)
Options:	74UPK3 Posts (48)
	5MP Casters (24)
	5MPB Casters (24)
Sup Info:	Assemble into five tier shelving units, locate bottom shelf 12” above floor.

ITEM #09	WIRE SHELVING
Quantity:	Nine (9)
Manufacturer:	Metro / Eagle group / Quantum
Model:	PR2448NK3 (45)
Options:	74UPK3 Posts (36)
	5MP Casters (18)
	5MPB Casters (18)
Sup Info:	Assemble into five tier shelving units, locate bottom shelf 12” above floor.

ITEM #10	COMMERCIAL WASTE CONTAINER
Quantity:	Eleven (11)
Manufacturer:	Rubbermaid
Model:	FG265500GRAY
	FG265400GRAY Lid (11)
	FG264000BLA Dolly (11)

ITEM #11	CLEAN DISHTABLE
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	CDTR-72-14/3
	E120 Table limit switch

ITEM #12	GLASS RACK, WALL MOUNT
Quantity:	Two (2)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	606642
Sup Info:	Furnish stainless steel mounting hardware of proper type for wall construction and to sustain weight while in use.
	Construction Trade shall provide wall blocking as required for mounting.

ITEM #13	DISHWASHER, CONVEYOR TYPE
Quantity:	One (1)
Manufacturer:	Hobart / Champion / Stero
Model:	CLPS86eN+BUILDUP
Options:	CLPS86EN-ADVHTE15K Electric tank heat 15kW
	CLPS86EN-ADVERH30K 30kW electric booster
	CLPS86EN-ADVELE0AX 208/60/3-ph
	SGLPT-KIT3-CLE Single point electrical connection
	HOBINST-SGLPT-CLE Accessory installation
	CLPS86EN-ADVHGTSTD Standard height

CLPS86EN-ADVDIR0LR Left to right operation
CLPS86EN-ADVFETSTD Standard feet
1/2INSHK-ABSRBR Water shock absorber kit
CLE/TBL-SWITCH Table limit switch CLE-Series
PRESREG-1/20BR pressure regulator
Exhaust fan activation switch

ITEM #14 CONDENSATE HOOD
Quantity: One (1)
Manufacturer: Captive Aire / Caddy / Avtec
Model: Size and shape per plan
Construction: Furnish and install condensate hood.

Entire condensate ventilation system shall be constructed in compliance with UL, NSF and any prevailing statutes and codes.

Fabricate entire hood of 18 gauge 304 stainless steel fully welded watertight construction.

Provide stainless steel welded hanger mounting clips with threaded stainless steel hanger and structural ceiling providing necessary angles and channels and utilizing stainless steel mounting hardware.

Mechanical (HVAC) Trade shall provide stainless steel welded ductwork (horizontal duct runs shall be pitched back toward condensate hood) and fan to comprise a complete condensate exhaust system.

Electrical Trade shall install fan switch with indicator lights located on dish machine and inter-wire to fan.

Furnish and install plastic drain tubing from nipple on bleeder drain outlet to soiled dishtable top surface.

Furnish and install 18 gauge stainless steel ceiling closure panels extending from the top of the exhaust ventilator to the finished ceiling. Panels shall be removable without the use of tools for access.

Furnish and install 18 gauge 304 stainless steel wall panels extending from the bottom of the rear of the exhaust hood to the upper edge of the baseboard molding and extending along the full length of all wall surfaces. Wall panel sections shall be fitted with ½" wide off-set seams at intermediate joints to allow panel sections to fit tightly against the wall and to result in watertight seams. Secure wall panels to building wall with wall panel adhesive of proper type for wall construction. Seal end seams with General Electric or equivalent clear silicone sealer.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #15	FOOD WASTE DISPOSER
Quantity:	Three (3)
Manufacturer:	Salvajor / In-sinkerator / Red Goat
Model:	300-CA-ARSS-LD
Options:	18CC Stainless steel cone cover (3) PP PP-type control panel with mounted solenoid valve, flow control & pressure switch for all controls (3) 980105 Mounting bracket (3) DP Dejamming prong (3)
Sup Info:	Foodservice Equipment Contractor shall furnish and install interconnecting piping and all components or parts as required by disposer manufacturer or as supplied as part of disposer in accordance with the manufacturer instructions. Foodservice Equipment Contractor shall furnish and install all interconnecting wiring as required between disposer motor and control device. Mount to control panel to wall or mounting bracket with stainless steel mounting hardware of proper type for application. Construction Trade shall reinforce wall as required to support weight of control panel while in use.
ITEM #16	SOILED DISHTABLE
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	SDTCL-60-14/4
Options:	Pre-rinse spray unit, splash mount 301190 Pre-rinse wall bracket -SRP Dishtable kit includes scrap basket, rack slide Disposal provision package
ITEM #17	HAND SINK
Quantity:	Sixteen (16)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	HSA-10-FAW
Options:	318496 Paper towel dispenser (16) 300602 Soap dispenser (16) -LRS Left and right side splashes (16)
Sup Info:	Furnish stainless steel mounting hardware of proper type for wall construction and to sustain weight while in use. Construction Trade shall provide wall blocking as required for mounting. Foodservice Equipment Contractor to verify soap dispenser and paper towel dispenser type with the District.
ITEM #18	TRASH CAN, SLIM
Quantity:	Twenty (20)

Manufacturer:	Rubbermaid
Model:	FG354060GRAY
Options:	FG267360GRAY Lid (20)

ITEM #19	DUNNAGE RACK
Quantity:	Nine (9)
Manufacturer:	Cambro / Metro / Eagle group
Model:	DRS480131

ITEM #20	WIRE SHELVING
Quantity:	Six (6)
Manufacturer:	Metro / Eagle group / Quantum
Model:	PR2436NK3 (30)
Options:	74UPK3 Posts (24) 5MP Casters (12) 5MPB Casters (12)
Sup Info:	Assemble into five tier shelving units, locate bottom shelf 12” above floor.

ITEM #21	WIRE SHELVING
Quantity:	One (1)
Manufacturer:	Metro / Eagle group / Quantum
Model:	PR2430NK3 (5)
Options:	74UPK3 Posts (4) 5MP Casters (2) 5MPB Casters (2)
Sup Info:	Assemble into five tier shelving units, locate bottom shelf 12” above floor.

ITEM #22	WALK-IN COOLER/FREEZER COMBINATION
Quantity:	One (1)
Manufacturer:	American Panel / Norbec / Arctic
Model:	Size and shape per plan
Construction:	Furnish and erect four (4) compartment sectional urethane insulated walk-in cooler assembly.

Walk-in assembly shall bear the UL label and NSF and Factory Mutual seals and meet 2015 Federal Regulations.

Ceiling and wall panels shall be constructed of 4" thick urethane insulation, assembly to be accomplished by the use of integral cam type locking device secured in place during the foaming process. Seams between panels shall be fully insulated with vinyl foamed-in-place gasket material.

Ceiling and wall panels shall be finished of 18 gauge embossed aluminum on interior and exterior surfaces.

Walk-in assembly shall be provided with 1/8” thick aluminum diamond tread plate floor with NSF approved coved corners, insulated with 4" thick urethane insulation and reinforced with ¾” thick 5-7 ply marine grade plywood underlayment. Floor in-

stallation shall be in accordance with manufacturer's recommended practice and shall sit in a depression. Building floor finish shall be flush and smooth to allow a level installation.

Construction Trade shall furnish and install floor depression and finished floor within walk-in assembly. Pitch floor within walk-in towards entrance door at 1/8" per foot minimum.

Walk-in assembly shall be furnished with in-fitting type door and frame assemblies constructed of 16 gauge stainless steel provided with three self-closing cam action chrome plated hinge assemblies, handles and hardware.

Provide each door with 2" dial type flush mount thermometer with chrome plated bezel mounted in door frame.

Provide each door with triple pane observation and 36" high x 1/8" thick aluminum diamond tread kick plates on both interior and exterior side.

Provide each door with UL listed vapor-proof LED light fixture complete with glass globe, toggle switch and pilot light and full perimeter frame condensation heater.

Provide twenty-four (24) additional UL listed vapor-proof LED ceiling mounted light fixtures (six in each compartment) complete with stainless steel mounting hardware.

Food Service Equipment Contractor shall install ceiling mounted light fixtures and furnish materials and inter-wire light fixtures and switch.

Walk-in freezer assembly shall be furnished with heated pressure relief port.

Furnish and install 18 gauge embossed aluminum vertical trim angles and ceiling closure panels.

Furnish and install entire refrigeration system complete with hermetic condensing units and insulated copper refrigeration lines charged with R448A refrigerant. Each condensing unit shall be interconnected to a low profile, high velocity evaporator coil in each walk-in compartment. Refrigeration system shall include all fittings, valves, switches, controls and all related components to comprise a complete operating unit of sufficient BTU capacity to maintain automatic operation of 35 degree F product temperature in cooler and -10 degree F product temperature in freezer.

Refrigeration system shall be provided with outdoor remote air cooled condensing units located outdoors on building roof.

Condensing units shall be provided with winterized controls (low ambient package) including crankcase heater, line dryer, head pressure control, and galvanized steel stand with stainless steel weather hood.

Provide all hangers and brackets as required to install refrigeration lines.

Construction Trade shall furnish all sleeves and openings through walls for passage of refrigeration lines.

Roofing Trade shall provide waterproof roof opening for passage of refrigeration lines.

Foodservice Equipment Contractor shall furnish materials and inter-wire defrost time clock circuit for walk-in freezer, from condensing unit to evaporator coil.

Foodservice Equipment Contractor shall furnish materials and install (wrap and insulate with foam pipe insulation) heat tracing tape to evaporator coil condensate line in walk-in freezer.

Food Service Equipment Contractor shall furnish and install copper tubing and extend evaporator coil condensate line to floor receptacle.

Set and adjust all temperature and defrost cycles.

Provide start-up and two year material and labor warranty on entire refrigeration system and five years manufacturer's warranty on compressor.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #23 SPARE NUMBER

ITEM #24 SPARE NUMBER

ITEM #25 EVAPORATOR, WALK-IN COOLER
Quantity: One (1)
Manufacturer: American Panel / Norbec / Arctic
Model: BEL0115BS6AM
Remarks: Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #26 CONDENSING UNIT, WALK-IN COOLER
Quantity: One (1)
Manufacturer: American Panel / Norbec / Arctic
Model: FFAP-A20Z-TFC-075
Remarks: Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #27 EVAPORATOR, WALK-IN COOLER
Quantity: One (1)
Manufacturer: American Panel / Norbec / Arctic
Model: BEL0115BS6AM
Remarks: Refer to latest approved Engineering Drawings for engineering data and design

methods and features which shall take precedence to this specification.

ITEM #28	CONDENSING UNIT, WALK-IN COOLER
Quantity:	One (1)
Manufacturer:	American Panel / Norbec / Arctic
Model:	FFAP-A20Z-TFC-075
Remarks:	Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #29	EVAPORATOR, WALK-IN FREEZER
Quantity:	One (1)
Manufacturer:	American Panel / Norbec / Arctic
Model:	BEL0130BS6EE
Remarks:	Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #30	CONDENSING UNIT, WALK-IN FREEZER
Quantity:	One (1)
Manufacturer:	American Panel / Norbec / Arctic
Model:	FFAL-A30Z-TFC-075
Remarks:	Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #31	EVAPORATOR, WALK-IN FREEZER
Quantity:	One (1)
Manufacturer:	American Panel / Norbec / Arctic
Model:	BEL0130BS6EE
Remarks:	Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #32	CONDENSING UNIT, WALK-IN FREEZER
Quantity:	One (1)
Manufacturer:	American Panel / Norbec / Arctic
Model:	FFAL-A30Z-TFC-075
Remarks:	Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #33	WIRE SHELVING
Quantity:	Two (2)
Manufacturer:	Metro / Eagle group / Quantum
Model:	PR2448NK3 (8)
Options:	70UPK3 Posts (8) 5MP Casters (4) 5MPB Casters (4)
Sup Info:	Assemble into four tier shelving units, locate bottom shelf 12” above floor.

ITEM #34 WIRE SHELVING

Quantity:	Eight (8)
Manufacturer:	Metro / Eagle group / Quantum
Model:	PR2436NK3 (32)
Options:	70UPK3 Posts (32)
	5MP Casters (16)
	5MPB Casters (16)
Sup Info:	Assemble into four tier shelving units, locate bottom shelf 12” above floor.

ITEM #35	WORK TABLE, STAINLESS STEEL TOP W/ PREP SINK
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	T30144SE
Options:	E36A Welded base
	E59 Undershelf upgrade
	E22 Sink bowl, weld in
	341189 Twist handle drain
	-TB bracket
	351585 Sink cover
	E47 Sink cover holder
	YCORSI-502971-MOD Drawer (2)
	DOS10132-14/3 Double overshelf

ITEM #36	WORK TABLE, STAINLESS STEEL
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	T30144SE
Options:	E36A Welded base
	E59 Undershelf upgrade
	YCORSI-502971-MOD Drawer (3)

ITEM #37	BUN PAN RACK
Quantity:	Eight (8)
Manufacturer:	Channel Manufacturing / Metro / Nexel
Model:	404A
Options:	/022 Corner bumper (8)
	/011 Casters with brakes (8)

ITEM #38	BLAST CHILLER, ROLL-IN
Quantity:	One (1)
Manufacturer:	American Panel / Irinox / Victory
Model:	AP20BCF200-3
Options:	(4) probes total
	Wi-Fi communication

ITEM #39	ICE BIN
Quantity:	One (1)
Manufacturer:	Hoshizaki / Manitowoc / Ice-o-Matic
Model:	B-500SF

Options:	LP-6 LEG Leg package HS-5607 Scoop holder kit
ITEM #40	ICE MAKER
Quantity:	Two (2)
Manufacturer:	Hoshizaki / Manitowoc / Ice-o-Matic
Model:	KM-515MAJ
ITEM #40F	WATER FILTRATION SYSTEM FOR ICE CUBER
Quantity:	Two (2)
Manufacturer:	Everpure / 3M / Optipure
Model:	QC7I SINGLE 4FC-S
Remarks:	EV969221 Replacement cartridge (2)
Sup Info:	Furnish stainless steel mounting hardware of proper type for wall construction and to sustain weight while in use. General contractor shall provide wall blocking as required for mounting. Food Service Equipment Contractor shall install ice maker filter system in water supply line and furnish and install interconnecting piping between water filter and ice maker water inlet.
ITEM #41	REVERSE OSMOSIS SYSTEM
Quantity:	Three (3)
Manufacturer:	Everpure / 3M / Optipure
Model:	EZ-RO 200/16G-BL
Remarks:	EV969331 Replacement cartridge (3) EZ-200 Replacement cartridge (3) RO SYSTEM INSTALL - LEVEL I Installation TEMP VALVE INSTALL (W/RO INSTALL) Installation of Thermostatic Mixing Valve (3)
Sup Info:	Furnish stainless steel mounting hardware of proper type for wall construction and to sustain weight while in use. General contractor shall provide wall blocking as required for mounting. Food Service Equipment Contractor shall install RO system in water supply line and furnish and install interconnecting piping between Ro system and combi oven water inlet. Food Service Equipment Contractor shall install RO system in water supply line and furnish and install interconnecting piping between Ro system and convection oven water inlet. Food Service Equipment Contractor shall install RO system in water supply line and furnish and install interconnecting piping between Ro system and hydrovection oven(s) water inlet.

ITEM #42 UTILITY DISTRIBUTION SYSTEM
Quantity: One (1)
Manufacturer: Captive Aire / Caddy / Avtec
Model: Size and shape per plan
Construction: Furnish and install utility distribution system.

Utility distribution system shall be fabricated in accordance with UL, NSF, NEC, IMC 2015.

Utility distribution system shall be fabricated of a minimum of 18 gauge 304 stainless steel consisting of two utility compartments and fabricated in sections as required with factory pre-assembled field connections and furnished with one primary end riser with single point connection for all utilities and one secondary end riser.

Primary riser shall be furnished with built-in exhaust hood controls, including push button fan control switches with status lights, individual and shunt-trip main circuit breaker and emergency “kill” button with guard.

Provide as part of raceway exhaust hood interlock device to prevent all electrically and gas operated cooking appliances from operating unless the supply and exhaust fans of the exhaust hood is operating as required by all local and prevailing codes including IMC 2015.

Provide raceway with splash proof electrical chase with copper wire-way wired to a circuit breaker panel box with ground fault protection for each appliance in the primary end riser, and UL listed power cords and matching electrical receptacles as required.

Provide raceway with gas supply (looped) service with shut-off valves for each disconnect hose or connection and safety retainer cables for each mobile appliance. Provide as part of utility distribution system, mechanically operated gas supply line shut-off valves to interrupt gas supply to all gas operated cooking appliances. Gas valves shall be provided with manual reset to prevent gas flow to pilot devices on appliances prior to restart.

Provide raceway with hot and cold water service with shut-off valves for each disconnect hose or connection and safety retainer cables for each mobile appliance.

Provide each riser with ventilator connecting collars for positive connection to the exhaust hood.

Provide secondary end riser with hinged access door for mounting of gas supply line shut-off valve (looped gas service).

Furnish and install labor and material to assemble all internal interconnecting gas piping, water piping and electrical wiring to install the utility distribution system. Test all connections for leaks.

ITEM #43	POWER WASH SINK
Quantity:	One (1)
Manufacturer:	Champion
Model:	PP3-STD-4TNK 156” L-R
Options:	Right to left configuration Left to right configuration “ soiled drainboard “ scrapper table “ power wash sink “ rinse sink “ sanitizing sink “ clean drainboard “ overall length Thermostat controlled electric wash tank heater with low water shut-off Automatic shut-down timer Rear discharge agitator with stainless steel pump and impeller Stainless steel perforated utensil basket Pre-rinse spray above scrapper table Factory installation of disposer cone in soiled drainboard Stainless steel disposer control panel Two faucet Lever drains with connected overflow

ITEM #44	INGREDIENT BINS
Quantity:	Six (6)
Manufacturer:	Cambro / Carlisle
Model:	IBS20148
Options:	SCP24CW135 Scoop (6)

ITEM #45	MIXER, FLOOR
Quantity:	One (1)
Manufacturer:	Hobart / Varimixer / Globe
Model:	HL800-1STD
Options:	BOWL-HL80P Mixer bowl DWHIP-HL80 wire whip
Sup Info:	Accessories include but not limited to power bowl lift, stainless steel bowl guard, stainless steel bowl, "B" beater, "ED" dough hook, bowl truck.

ITEM #46	FOOD CUTTER
Quantity:	One (1)
Manufacturer:	Hobart / Varimixer / Globe
Model:	84145-18
Options:	VS9-12 Vegetable slicer

ITEM #47	WORK TABLE, STAINLESS STEEL TOP W/ DBL PREP SINK
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	T30144SE

Options:	E36A Welded base E59 Undershelf upgrade E22 Sink bowl, weld in (2) 341189 Twist handle drain (2) -TB bracket 351585 Sink cover (2) E47 Sink cover holder YCORSI-502971-MOD Drawer (2) DOS10132-14/3 Double overshelf
ITEM #48	CONVECTION STEAMER
Quantity:	Two (2)
Manufacturer:	Cleveland / Groen / Vulcan
Model:	24-CGA-10.2
Options:	Gas pressure regulator (2) 11000115898 Installation of unit (2) 11000115830 Pre installation site survey (2) INSKITCGA6 Installation kit (2) DISSOLVE Descaling solution (2) BDPK1 Boiler descaling pump kit (2) LGDCK Drain cooling kit (2) Dormont 1675KITCF2S48 Gas hose kit (2) Dormont W75BP2Q48 Water hose kit (4)
Sup Info:	Foodservice Equipment Contractor shall install disconnect at wall connection and to cooking appliance per manufacturer's instructions. Foodservice Equipment Contractor shall provide and secure restraining cable between wall and equipment.
ITEM #49	WORK TABLE, STAINLESS STEEL TOP
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	T3030SE-BS
Options:	E36A Welded base E59 Undershelf upgrade
ITEM #50	REACH-IN REFRIGERATOR
Quantity:	One (1)
Manufacturer:	Continental / Victory / True
Model:	SW60N24M
Options:	Stainless steel interior Stainless steel exterior Stainless steel case back Field reversible door Exterior mounted digital thermometer Automatic condensate evaporator Swivel casters with polyurethane tires and front locking brakes Plug and cord set

	Flat lid with vision panel with hinges DOS60 Double overshelf
ITEM #51	REACH-IN REFRIGERATOR
Quantity:	One (1)
Manufacturer:	Continental / Victory / True
Model:	3RNSS
Options:	Stainless steel interior Stainless steel exterior Stainless steel case back Left Door hinged on left, center & right doors hinged on right, standard Exterior mounted digital thermometer Automatic condensate evaporator Swivel casters with polyurethane tires and front locking brakes Plug and cord set
ITEM #52	REACH-IN FREEZER
Quantity:	One (1)
Manufacturer:	Continental / Victory / True
Model:	1FNSS
Options:	Stainless steel interior Stainless steel exterior Stainless steel case back Door hinged on right, standard Exterior mounted digital thermometer Automatic condensate evaporator Swivel casters with polyurethane tires and front locking brakes Plug and cord set
ITEM #53	EXHAUST HOOD
Quantity:	One (1)
Manufacturer:	Captive Aire / Caddy / Avtec
Model:	Size and shape as per plan
Construction:	Furnish and install exhaust hood with integral plenum box make-air system.

Entire exhaust ventilation system shall be constructed in compliance with UL, NSF, NFPA, IMC 2018 (including automatic start-up of the exhaust and supply ventilation upon activation of any cooking appliance) and any prevailing statutes and codes.

Hood shall be 15’-9” long constructed in one equal sections of 18 gauge 304 stainless steel with all seams continuously welded, ground smooth and polished. Hood mounted utility cabinet is 1’. Provide a full compliment of stainless steel “high efficiency” Captrate Solo baffle type grease extractors.

Furnish remote bulb thermostat with watertight hardware and install in either the exhaust plenum of the hood or in the exhaust duct. Provide NEMA 3 control panel box with hinged front cover complete with supply and exhaust fan contactors wired to an adjustable thermostat control, field wiring terminal strip and on-off switch.

Provide 18 gauge 304 stainless steel supply and exhaust duct collar.

Provide 18 gauge 304 stainless steel insulated supply air plenum box assembly with internal air volume control damper integral along the face of the hood. Mount in finished ceiling along face of hood and furnish full length stainless steel perforated removable panels for discharge of supply air along entire face of hood.

Provide stainless steel threaded hanger rods complete with stainless steel mounting hardware for securing to structural ceiling.

Mechanical (HVAC) Trade shall furnish and install a complete exhaust air handling system including exhaust fan and controller, fan start-stop switch with status lights, 16 gauge insulated welded ductwork from exhaust collar on exhaust hood to fan, hinged roof curb with grease trough and removable grease container.

Mechanical (HVAC) Trade shall install exhaust hood heat detector(s) in exhaust hoods with multiple exhaust collars in the exhaust duct just after the point of the pant leg juncture; this includes punching of the required hole in the duct and installation of the heat detector and fitting.

Mechanical (HVAC) Trade shall furnish and install a complete supply air handling system including supply fan and controller (with maintainable filter system) and supply air heater with thermostat control (to temper incoming supply air below 65 degree F ambient), fan start-stop switch with indicator lights, galvanized steel ductwork from supply collar on exhaust hood to fan and roof curb.

Electrical Trade shall furnish and install interconnecting wiring between fan motors, controllers and switches.

Electrical Trade shall furnish and install inter-wiring of cooking appliance start-up inter-lock device and the supply and exhaust ventilation system and wire per the manufacturer’s instructions and per applicable codes.

Furnish four (4) UL listed vapor-proof recessed LED light fixtures wired to a common on-off switch with stainless steel cover plate located in hood mounted utility cabinet.

Electrical Trade shall furnish materials and inter-wire light fixtures to hood mounted utility cabinet.

Mechanical (HVAC) Trade shall furnish and install INVERTER DUTY THREE PHASE exhaust fan and controller.

Mechanical (HVAC) Trade shall furnish fans set compatible with variable frequency drive specification.

Electrical Trade shall furnish and install Interconnecting wiring of the system between the exhaust hood sensors, remote frequency drive unit and exhaust and supply fan motors.

Furnish and install 18 gauge stainless steel ceiling closure panels extending from the top of the exhaust ventilator to the finished ceiling. Panels shall be removable without the use of tools for access.

Furnish and install 18 gauge 304 stainless steel wall panels extending from the bottom of the rear of the exhaust hood to the upper edge of the baseboard molding and extending along the full length of all wall surfaces. Wall panel sections shall be fitted with ½" wide off-set seams at intermediate joints to allow panel sections to fit tightly against the wall and to result in watertight seams. Secure wall panels to building wall with wall panel adhesive of proper type for wall construction. Seal end seams with General Electric or equivalent clear silicone sealer.

Electrical Trade shall provide the inter-wiring between the control enclosure, fire system, supply and exhaust fans and variable frequency drives and duct riser temperature switch.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #53.1 HOOD CONTROL PANEL
Quantity: One (1)
Manufacturer: Captive Aire / Caddy / Avtec
Model: Size and shape per plan
Sup Info: Furnish 18 gauge stainless steel utility and fire system enclosure cabinet with hinged access doors for both hood and fire system controls and fire suppression tanks. System shall be listed by ETL (UL 508A) NSF, NFPA, IMC 2018 and any prevailing statutes or codes including automatic shut-down of all cooking appliances per code section 44 of NFPA 17-27. Cabinet may be freestanding wall type or integral with exhaust hood as shown on the contract drawings. Furnish stainless steel mounting hardware of proper type for wall construction for wall mounted cabinet.

Furnish and install variable volume motor control center with variable frequency drive, input / output processor and keypad enclosed within a stainless steel utility cabinet for remote mounting. System shall include, but not be limited to, electronic variable volume motor starters with thermal overload, input / output processors, control keypad, temperature and optic sensors and plug and play cables. Temperature sensor shall be mounted in the exhaust duct collar; optic sensor shall be mounted inside the ends of the hood with air purge units mounted on top.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #53.2 FIRE PROTECTION SYSTEM
Quantity: One (1)

Manufacturer: Captive Aire
Model: TANK
Sup Info: Furnish and install in exhaust hood, plenum and surface fire protection system.

TANK Fire Suppression is a pre-engineered, stored-pressure wet chemical solutionextinguishing system.

TANK Fire Suppression System shall be UL & ULC listed in accordance with UL300,UL1254, ULCORD-C1254.6.

Microprocessor-based control board shall be ETL Listed to UL Standard 864 and CAN/ULC-S527-11.

TANK Fire Suppression System intended for installation and for use in accordance withthe National Fire Protection Association Standards:

1. Wet Chemical Extinguishing Systems, NFPA 17A
2. National Electrical Code, NFPA 70
3. National Fire Alarm & Signaling Code, NFPA 72

New York City and FDNY approved under COA# 5870.

California State Fire Marshal (CFSM), Listing No. 7085-2199:0502.

A pre-engineered, fixed pipe, automatic wet chemical agent fire suppression system forprotection of all hazard areas associated with cooking operations, including exhaust hoods, plenums, ductwork, and cooking appliances.

Exhaust hood fire system components to be factory installed.

Cylinder and Valve Assembly

1. The cylinders shall have a tin-nickel alloy plated brass valve with pressure gauge.
2. Wet chemical agent shall be contained in one or more stored pressure DOT/TC ratedsteel cylinder and valve assemblies.
3. Each cylinder is factory-filled with liquid fire suppressant and pressurized to 200 PSIGat 70°F.

Distribution Nozzles

4. Nozzles shall be located to protect the exhaust ducts, plenums, and all cookingappliances requiring protection.
5. All nozzles shall be equipped with a metal blow off cap. The cap prevents contamination from entering the pipe network and is designed to pop-off upon system discharge, allowing agent to flow to the protected hazard area.
6. All nozzles shall incorporate a stamped part number to easily identify nozzle type.

Distribution System

7. The distribution system shall consist of Copper, Schedule 40 black iron, chrome-plated or stainless-steel pipe and fittings. All exposed piping and fittings must be chrome-plated or stainless steel.

8. Fittings shall be minimum class 150. Galvanized fittings shall not be used.

Suppression System

9. The system control equipment shall be capable of all functions associated with automatically and manually discharging the wet chemical agent from all cylinder andvalve assemblies, including automatic shutdown of the heat source or fuel and electrical power to all protected areas upon system discharge.

10. Liquid Fire Suppressant shall be Aqueous Potassium Carbonate (APC).

11. All mechanical components of the actuator kit shall be enclosed.

12. The actuator kit shall be capable of automatic or manual activation means.

13. Supervisory Pressure Switch added to monitor operating system pressure.

14. For manual activation, an electrically operated manual release shall be used toactuate the system manually.

15. For automatic activation, the system will be activated by a Firestat (heat) detector.

Electrical

16. Electrical Division to provide shunt trip breakers at main power panel, or disconnects,as designated by the Electrical Engineer; interconnection provided at hood control panel for the signal to shut down all electricity in and under the exhaust hood. Shunt trips/disconnects to accomplish shut off of electricity in the event of fire system activation by others.

17. Printed circuit board with microprocessor-based controller that provides all the necessary monitoring, timing, and supervision functions required for the reliableoperation of the fire system.

18. Independent supervised loops incorporate redundancy and fault detection.

19. Real-time cloud-based monitoring connection provided with system by ownership.

20. Primary power supply, with battery backup for power loss.

21. All wiring must be in accordance to NFPA 70 and the Authority Having Jurisdiction(AHJ).

22. Electric gas valve provided for equipment below exhaust hood. Coordinate size andinstallation with Plumbing Division.

23. All wiring is to be in accordance with the applicable manufacturer’s instructions for thefire alarm control panel, gas shut-off valve, manual reset relay, and contractor supplied shut-off devices.

As part of this item, provide wall mounted type K handheld portable fire extinguisher, placard, and mounting bracket as required in the immediate vicinity of each cooking area,per NFPA-96 and NFPA-10. Additional fire extinguishers as required in the kitchen area are to be specified by the Architect and provided by the General Contractor.

Inter-wiring of the fire system to the exhaust hood shall be furnished and installed by the Electrical Trade.

Provide as part of fire system, electrically operated gas supply line shut-off valve (two required for “loop” gas service) to interrupt gas supply to all gas operated cooking appliances. Gas valve shall be provided with manual reset to prevent gas flow to pilot devices on appliances prior to restart.

Provide one remote manual pull station to actuate fire system in the event of a fire.

Plumbing Trade shall install gas shut-off valve(s) in gas supply line.

Electrical Trade shall inter-wire gas shut-off valve(s) to fire system.

Electrical Trade shall furnish and install electric shunt-trip circuit breakers or electric shut-off contactors to interrupt electric power to all electrically operated cooking appliances.

Provide dry contacts in fire system to interface with building fire alarm system as required, electrical tie-in shall be the responsibility of the Electrical Trade.

Provide as part of fire system, start-up testing of the fire system as required by local fire codes. Subsequent testing of the fire system for a period of one year after start-up shall be included as part of this contract.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

Install in accordance with manufacturer's instructions, drawings, written specifications,manufacturer’s installation manual, and all applicable building codes.

Six-month and twelve-month inspections, servicing, and replacement of components asper NFPA 96 to be provided by the General Contractor or Owner.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #54	TILT SKILLET
Quantity:	One (1)
Manufacturer:	Cleveland / Groen / Vulcan
Model:	SGL-30-T1

Options:	DPK-13 Double pantry faucet TDDC Drain cup assembly Pan carrier PT-2 power tilt with manual override TD2SK 2” tangent draw-off FSSK food strainer CST-1 casters Gas pressure regulator Dormont 1675KITCF2S-48PS gas hose kit W50BP48 Water hose kit (2)
Sup Info:	Foodservice Equipment Contractor shall install disconnect at wall connection and to cooking appliance per manufacturer’s instructions. Foodservice Equipment Contractor shall provide and secure restraining cable between wall and equipment.

ITEM #55	FLOOR TROUGH
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	FT-2496-SG
Sup Info:	Construction Trade shall provide floor recess and install floor pan in recess flush with adjacent kitchen floor in a watertight manner.

ITEM #56	KETTLE, STEAM JACKETED
Quantity:	Two (2)
Manufacturer:	Cleveland / Groen / Vulcan
Model:	KGL-40-T
Options:	TD2 2" tangent draw-off valve with strainer TDDC Drain cup assembly KM2G Kettle Markings, 5 gallon increments CHS40 Spring assisted cover DKFK Double pantry kettle filler with 60” hose KAK Kettle Accessory Kit Gas pressure regulator Dormont 1675KITCF2S-48 gas hose kit (2) Dormont W50BP48 Water hose kit (4)
Sup Info:	Foodservice Equipment Contractor shall install disconnect at wall connection and to cooking appliance per manufacturer’s instructions. Foodservice Equipment Contractor shall provide and secure restraining cable between wall and equipment.

ITEM #57	EXHAUST HOOD
Quantity:	One (1)
Manufacturer:	Captive Aire / Caddy / Avtec
Model:	Size and shape as per plan
Construction:	Furnish and install exhaust hood with integral plenum box make-air system.

Entire exhaust ventilation system shall be constructed in compliance with UL, NSF, NFPA, IMC 2018 (including automatic start-up of the exhaust and supply ventilation upon activation of any cooking appliance) and any prevailing statutes and codes.

Hood shall be 14'-6" long constructed in one equal sections of 18 gauge 304 stainless steel with all seams continuously welded, ground smooth and polished. Hood mounted utility cabinet is 1'. Provide a full compliment of stainless steel "high efficiency" Captrate Solo baffle type grease extractors.

Furnish remote bulb thermostat with watertight hardware and install in either the exhaust plenum of the hood or in the exhaust duct. Provide NEMA 3 control panel box with hinged front cover complete with supply and exhaust fan contactors wired to an adjustable thermostat control, field wiring terminal strip and on-off switch.

Provide 18 gauge 304 stainless steel supply and exhaust duct collar.

Provide 18 gauge 304 stainless steel insulated supply air plenum box assembly with internal air volume control damper integral along the face of the hood. Mount in finished ceiling along face of hood and furnish full length stainless steel perforated removable panels for discharge of supply air along entire face of hood.

Provide stainless steel threaded hanger rods complete with stainless steel mounting hardware for securing to structural ceiling.

Mechanical (HVAC) Trade shall furnish and install a complete exhaust air handling system including exhaust fan and controller, fan start-stop switch with status lights, 16 gauge insulated welded ductwork from exhaust collar on exhaust hood to fan, hinged roof curb with grease trough and removable grease container.

Mechanical (HVAC) Trade shall install exhaust hood heat detector(s) in exhaust hoods with multiple exhaust collars in the exhaust duct just after the point of the pant leg juncture; this includes punching of the required hole in the duct and installation of the heat detector and fitting.

Mechanical (HVAC) Trade shall furnish and install a complete supply air handling system including supply fan and controller (with maintainable filter system) and supply air heater with thermostat control (to temper incoming supply air below 65 degree F ambient), fan start-stop switch with indicator lights, galvanized steel ductwork from supply collar on exhaust hood to fan and roof curb.

Electrical Trade shall furnish and install interconnecting wiring between fan motors, controllers and switches.

Electrical Trade shall furnish and install inter-wiring of cooking appliance start-up inter-lock device and the supply and exhaust ventilation system and wire per the manufacturer's instructions and per applicable codes.

Furnish four (4) UL listed vapor-proof recessed LED light fixtures wired to a common on-off switch with stainless steel cover plate located in hood mounted utility cabinet.

Electrical Trade shall furnish materials and inter-wire light fixtures to hood mounted utility cabinet.

Mechanical (HVAC) Trade shall furnish and install INVERTER DUTY THREE PHASE exhaust fan and controller.

Mechanical (HVAC) Trade shall furnish fans set compatible with variable frequency drive specification.

Electrical Trade shall furnish and install Interconnecting wiring of the system between the exhaust hood sensors, remote frequency drive unit and exhaust and supply fan motors.

Furnish and install 18 gauge stainless steel ceiling closure panels extending from the top of the exhaust ventilator to the finished ceiling. Panels shall be removable without the use of tools for access.

Furnish and install 18 gauge 304 stainless steel wall panels extending from the bottom of the rear of the exhaust hood to the upper edge of the baseboard molding and extending along the full length of all wall surfaces. Wall panel sections shall be fitted with ½" wide off-set seams at intermediate joints to allow panel sections to fit tightly against the wall and to result in watertight seams. Secure wall panels to building wall with wall panel adhesive of proper type for wall construction. Seal end seams with General Electric or equivalent clear silicone sealer.

Electrical Trade shall provide the inter-wiring between the control enclosure, fire system, supply and exhaust fans and variable frequency drives and duct riser temperature switch.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #57.1	HOOD CONTROL PANEL
Quantity:	One (1)
Manufacturer:	Captive Aire / Caddy / Avtec
Model:	Size and shape per plan
Sup Info:	Furnish 18 gauge stainless steel utility and fire system enclosure cabinet with hinged access doors for both hood and fire system controls and fire suppression tanks. System shall be listed by ETL (UL 508A) NSF, NFPA, IMC 2018 and any prevailing statutes or codes including automatic shut-down of all cooking appliances per code section 44 of NFPA 17-27. Cabinet may be freestanding wall type or integral with exhaust hood as shown on the contract drawings. Furnish stainless steel mounting hardware of proper type for wall construction for wall mounted cabinet.

Furnish and install variable volume motor control center with variable frequency drive, input / output processor and keypad enclosed within a stainless steel utility cabinet for remote mounting. System shall include, but not be limited to, electronic variable volume motor starters with thermal overload, input / output processors, control keypad, temperature and optic sensors and plug and play cables. Temperature sensor shall be mounted in the exhaust duct collar; optic sensor shall be mounted inside the ends of the hood with air purge units mounted on top.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #57.2 FIRE PROTECTION SYSTEM
Quantity: One (1)
Manufacturer: Captive Aire
Model: TANK
Sup Info: Furnish and install in exhaust hood, plenum and surface fire protection system.

TANK Fire Suppression is a pre-engineered, stored-pressure wet chemical solutionextinguishing system.

TANK Fire Suppression System shall be UL & ULC listed in accordance with UL300,UL1254, ULCORD-C1254.6.

Microprocessor-based control board shall be ETL Listed to UL Standard 864 and CAN/ULC-S527-11.

TANK Fire Suppression System intended for installation and for use in accordance withthe National Fire Protection Association Standards:

4. Wet Chemical Extinguishing Systems, NFPA 17A
5. National Electrical Code, NFPA 70
6. National Fire Alarm & Signaling Code, NFPA 72

New York City and FDNY approved under COA# 5870.

California State Fire Marshal (CFSM), Listing No. 7085-2199:0502.

A pre-engineered, fixed pipe, automatic wet chemical agent fire suppression system forprotection of all hazard areas associated with cooking operations, including exhaust hoods, plenums, ductwork, and cooking appliances.

Exhaust hood fire system components to be factory installed.

Cylinder and Valve Assembly

24. The cylinders shall have a tin-nickel alloy plated brass valve with pressure gauge.
25. Wet chemical agent shall be contained in one or more stored pressure DOT/TC

ratedsteel cylinder and valve assemblies.

26. Each cylinder is factory-filled with liquid fire suppressant and pressurized to 200 PSIGat 70°F.

Distribution Nozzles

27. Nozzles shall be located to protect the exhaust ducts, plenums, and all cookingappliances requiring protection.

28. All nozzles shall be equipped with a metal blow off cap. The cap prevents contamination from entering the pipe network and is designed to pop-off upon system discharge, allowing agent to flow to the protected hazard area.

29. All nozzles shall incorporate a stamped part number to easily identify nozzle type.

Distribution System

30. The distribution system shall consist of Copper, Schedule 40 black iron, chrome-plated or stainless-steel pipe and fittings. All exposed piping and fittings must be chrome-plated or stainless steel.

31. Fittings shall be minimum class 150. Galvanized fittings shall not be used.

Suppression System

32. The system control equipment shall be capable of all functions associated with automatically and manually discharging the wet chemical agent from all cylinder andvalve assemblies, including automatic shutdown of the heat source or fuel and electrical power to all protected areas upon system discharge.

33. Liquid Fire Suppressant shall be Aqueous Potassium Carbonate (APC).

34. All mechanical components of the actuator kit shall be enclosed.

35. The actuator kit shall be capable of automatic or manual activation means.

36. Supervisory Pressure Switch added to monitor operating system pressure.

37. For manual activation, an electrically operated manual release shall be used toactuate the system manually.

38. For automatic activation, the system will be activated by a Firestat (heat) detector.

Electrical

39. Electrical Division to provide shunt trip breakers at main power panel, or disconnects,as designated by the Electrical Engineer; interconnection provided at hood control panel for the signal to shut down all electricity in and under the exhaust hood. Shunt trips/disconnects to accomplish shut off of electricity in the event of fire system activation by others.

40. Printed circuit board with microprocessor-based controller that provides all the necessary monitoring, timing, and supervision functions required for the reliableoperation of the fire system.

41. Independent supervised loops incorporate redundancy and fault detection.

42. Real-time cloud-based monitoring connection provided with system by ownership.

43. Primary power supply, with battery backup for power loss.

44. All wiring must be in accordance to NFPA 70 and the Authority Having Ju-

risdiction(AHJ).

45. Electric gas valve provided for equipment below exhaust hood. Coordinate size andinstallation with Plumbing Division.

46. All wiring is to be in accordance with the applicable manufacturer's instructions for thefire alarm control panel, gas shut-off valve, manual reset relay, and contractor supplied shut-off devices.

As part of this item, provide wall mounted type K handheld portable fire extinguisher, placard, and mounting bracket as required in the immediate vicinity of each cooking area,per NFPA-96 and NFPA-10. Additional fire extinguishers as required in the kitchen area are to be specified by the Architect and provided by the General Contractor.

Inter-wiring of the fire system to the exhaust hood shall be furnished and installed by the Electrical Trade.

Provide as part of fire system, electrically operated gas supply line shut-off valve (two required for "loop" gas service) to interrupt gas supply to all gas operated cooking appliances. Gas valve shall be provided with manual reset to prevent gas flow to pilot devices on appliances prior to restart.

Provide one remote manual pull station to actuate fire system in the event of a fire.

Plumbing Trade shall install gas shut-off valve(s) in gas supply line.

Electrical Trade shall inter-wire gas shut-off valve(s) to fire system.

Electrical Trade shall furnish and install electric shunt-trip circuit breakers or electric shut-off contactors to interrupt electric power to all electrically operated cooking appliances.

Provide dry contacts in fire system to interface with building fire alarm system as required, electrical tie-in shall be the responsibility of the Electrical Trade.

Provide as part of fire system, start-up testing of the fire system as required by local fire codes. Subsequent testing of the fire system for a period of one year after start-up shall be included as part of this contract.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

Install in accordance with manufacturer's instructions, drawings, written specifi-

cations,manufacturer's installation manual, and all applicable building codes.

Six-month and twelve-month inspections, servicing, and replacement of components asper NFPA 96 to be provided by the General Contractor or Owner.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #58	CONVECTION OVEN
Quantity:	Two (2)
Manufacturer:	Garland / Blodgett / Vulcan
Model:	DFG-200 DBL
	Solid state thermostat
	Mechanical timer
	Stainless steel draft diverter
	4 ¼" low profile swivel casters with polyurethane tires and front locking brakes
	Stainless steel solid back panel
	Stainless steel solid doors with view window
	Gas manifold
	Gas pressure regulator
	Dormont 1675KITCF2S48 Gas hose kit
Sup Info:	Foodservice Equipment Contractor shall install disconnect at wall connection and to cooking appliance per manufacturer's instructions.
	Foodservice Equipment Contractor shall provide and secure restraining cable between wall and equipment.
ITEM #59	HEAVY DUTY RANGE
Quantity:	One (1)
Manufacturer:	Garland / Vulcan / Impererial
Model:	M43R
Options:	3/4" Rear gas connection, including "Tee" in manifold, end cap & cover
	Stainless steel main back
	Swivel Casters, with Polyurethane wheels (non-marking)
	M34SD Single High Shelf
	Gas pressure regulator
	Dormont 1675KITCF2S-48 gas hose kit
Sup Info:	Foodservice Equipment Contractor shall install disconnect at wall connection and to cooking appliance per manufacturer's instructions.
	Foodservice Equipment Contractor shall provide and secure restraining cable between wall and equipment.
ITEM #60	WORK TABLE, STAINLESS STEEL TOP W/ PREP SINK
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	T30144SE

Options: E36A Welded base
E59 Undershelf upgrade
E24A Sink bowl, weld in
341189 Twist handle drain
-TB bracket
351585 Sink cover
E47 Sink cover holder
YCORSI-502971-MOD Drawer (2)
E41A Disposal provision package

ITEM #61 HEATED CABINET, PASS THRU
Quantity: Five (5)
Manufacturer: Continental / Victory / True
Model: DL1WE-SS-PT
Options: Stainless steel interior (5)
Stainless steel exterior (5)

- Door hinged on right, control side (2 most southern boxes on FS 1.1)
- Door hinged on left, rear side (2 most southern boxes on FS 1.1)
- Door hinged on left, control side, Door hinged on right, rear side (second box down from north on FS 1.1)
- Door hinged on right, control side, door hinged on right, rear side (northern most box on FS 1.1)
- Door hinged on left, control side, door hinged on left, rear side (box on FS 1.2)

Exterior mounted digital thermometer (5)
Swivel casters with polyurethane tires and front locking brakes (5 sets)
Plug and cord set (5)
50-P008A-E Pan slide assembly (5)

ITEM #62 REFRIGERATOR, PASS THRU
Quantity: Five (5)
Manufacturer: Continental / Victory / True
Model: 1RENPT
Options: Stainless steel interior (5)
Stainless steel exterior (5)

- Door hinged on right, control side (2 most southern boxes on FS 1.1)
- Door hinged on left, rear side (2 most southern boxes on FS 1.1)
- Door hinged on left, control side, Door hinged on right, rear side (second box down from north on FS 1.1)
- Door hinged on right, control side, door hinged on right, rear side (northern most box on FS 1.1)
- Door hinged on left, control side, door hinged on right, rear side (box on FS 1.2)

Exterior mounted digital thermometer (5)
Swivel casters with polyurethane tires and front locking brakes (5 sets)
Plug and cord set (5)
50-P008A-E Pan slide assembly (5)

ITEM #63	HYDROVECTION OVEN
Quantity:	One (1)
Manufacturer:	Blodgett / Garland / Vulcan
Model:	HV-100G ADDL
	Stainless steel front, top sides and back
	Natural gas
	58412 Platinum Professional Installation
	Side heat shield, per section
	Water pressure regulator (per section)
	Multi-purpose fry pan
	Gas pressure regulator
	Stacking kit included, stack onto #X-02
	Dormont 1675KITCF2S48 Gas hose kit
	W75BP48 Water hose connector kit
Sup Info:	Foodservice Equipment Contractor shall install disconnect at wall connection and to cooking appliance per manufacturer's instructions.
	Foodservice Equipment Contractor shall provide and secure restraining cable between wall and equipment.

ITEM #64	SHELF, MOP
Quantity:	Two (2)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	US0824-16/3
Sup Info:	Furnish stainless steel mounting hardware of proper type for wall construction and to sustain weight while in use.
	Construction Trade shall provide wall blocking as required for mounting.

ITEM #65	MOP SINK
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	F1916
Options:	321561 Mop broom holder
	312690 Service faucet
	503096 Splash kit
Sup Info:	All seams sealed with General Electric or equivalent silicone sealer.

ITEM #66	WORK TABLE, STAINLESS STEEL TOP
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	T3084SE-BS
Options:	E36A Welded base
	E59 Undershelf upgrade
	YCORSI-502971-MOD Drawer

ITEM #67 REACH-IN REFRIGERATOR

Quantity:	One (1)
Manufacturer:	Continental / True / Victory
Model:	1RNSS
Options:	Stainless steel interior
	Stainless steel exterior
	Stainless steel case back
	Door hinged on left
	Exterior mounted digital thermometer
	Automatic condensate evaporator
	Swivel casters with polyurethane tires and front locking brakes
	Plug and cord set
	50-P008A Pan slide assembly
	Three (3) additional shelves on bottom section

ITEM #68	P.O.S. SYSTEM
Quantity:	Five (5)
Sup Info:	Not in Foodservice Equipment contract, furnished by the Owner.

ITEM #69	CASHIER COUNTER
Quantity:	Four (4)
Manufacturer:	Duke/ Multiteria / Delfield
Model:	TCS-30SS
Options:	Owner/Architect to select laminate finish (4)
	Custom size 60”W
	CS-DR-LK Stainless steel drawer with lock (4)
	SOLID-HD-2OC Tray slide, opposite cashier (4)
	MOD-2S-2OC Kickplate, opposite cashier (4)

ITEM #70	MILK COOLER
Quantity:	Four (4)
Manufacturer:	Beverage Air / Continental / True
Model:	NC28-1-W

ITEM #71	SOLID TOP UNIT
Quantity:	Eight (8)
Manufacturer:	Duke/ Multiteria / Delfield
Model:	TST-32SS
Options:	Owner/Architect to select laminate finish (8)
	SOLID-HD-2CU Tray slide, customer side (8)
	MOD-2S-2CU Kick plate, customer side (8)

ITEM #72	DROP-IN, HOT/COLD/FREEZE
Quantity:	One (1)
Manufacturer:	Duke/ Multiteria / Delfield
Model:	HCF-4
Options:	HCF-4-120 120v/60/1-ph, 21.0 amps, NEMA 5L-30P
	Fill faucet

ITEM #73	TRIANGLE CORNER UNIT
Quantity:	Four (4)
Manufacturer:	Duke/ Multiteria / Delfield
Model:	TTU-90SS
Options:	Owner/Architect to select laminate finish (4)

ITEM #74	FOOD WASTE DISPOSER
Quantity:	One (1)
Manufacturer:	Salvajor / In-sinkerator / Red Goat
Model:	300-SA-3-ARSS-LD
Options:	980105 Mounting bracket DP Dejamming prong SLE6SS Seismic flange for leg support
Sup Info:	Foodservice Equipment Contractor shall furnish and install interconnecting piping and all components or parts as required by disposer manufacturer or as supplied as part of disposer in accordance with the manufacturer instructions. Foodservice Equipment Contractor shall furnish and install all interconnecting wiring as required between disposer motor and control device. Mount to control panel to wall or mounting bracket with stainless steel mounting hardware of proper type for application. Construction Trade shall reinforce wall as required to support weight of control panel while in use.

ITEM #75	DROP-IN, HOT/COLD/FREEZE
Quantity:	Eight (8)
Manufacturer:	Duke/ Multiteria / Delfield
Model:	HCF-3
Options:	HCF-3-120 120v/60/1-ph, 16.0 amps, NEMA 5-20P (8) Fill Faucet (8)

ITEM #76	WALK-IN COOLER/FREEZER COMBINATION
Quantity:	One (1)
Manufacturer:	American Panel / Norbec / Arctic
Model:	Size and shape per plan
Construction:	Furnish and erect two (2) compartment sectional urethane insulated walk-in cooler assembly. Walk-in assembly shall bear the UL label and NSF and Factory Mutual seals and meet 2015 Federal Regulations. Ceiling and wall panels shall be constructed of 4" thick urethane insulation, assembly to be accomplished by the use of integral cam type locking device secured in place during the foaming process. Seams between panels shall be fully insulated with vinyl foamed-in-place gasket material.

Ceiling and wall panels shall be finished of 18 gauge embossed aluminum on interior and exterior surfaces.

Walk-in assembly shall be provided with 1/8” thick aluminum diamond tread plate floor with NSF approved coved corners, insulated with 4" thick urethane insulation and reinforced with ¾” thick 5-7 ply marine grade plywood underlayment. Floor installation shall be in accordance with manufacturer’s recommended practice and shall sit in a depression. Building floor finish shall be flush and smooth to allow a level installation.

Construction Trade shall furnish and install floor depression and finished floor within walk-in assembly. Pitch floor within walk-in towards entrance door at 1/8" per foot minimum.

Walk-in assembly shall be furnished with in-fitting type door and frame assemblies constructed of 16 gauge stainless steel provided with three self-closing cam action chrome plated hinge assemblies, handles and hardware.

Provide each door with 2" dial type flush mount thermometer with chrome plated bezel mounted in door frame.

Provide each door with triple pane observation and 36” high x 1/8” thick aluminum diamond tread kick plates on both interior and exterior side.

Provide each door with UL listed vapor-proof LED light fixture complete with glass globe, toggle switch and pilot light and full perimeter frame condensation heater.

Provide eight (8) additional UL listed vapor-proof LED ceiling mounted light fixtures (four in each compartment) complete with stainless steel mounting hardware.

Food Service Equipment Contractor shall install ceiling mounted light fixtures and furnish materials and inter-wire light fixtures and switch.

Walk-in freezer assembly shall be furnished with heated pressure relief port.

Furnish and install 18 gauge embossed aluminum vertical trim angles and ceiling closure panels.

Furnish and install entire refrigeration system complete with hermetic condensing units and insulated copper refrigeration lines charged with R448A refrigerant. Each condensing unit shall be interconnected to a low profile, high velocity evaporator coil in each walk-in compartment. Refrigeration system shall include all fittings, valves, switches, controls and all related components to comprise a complete operating unit of sufficient BTU capacity to maintain automatic operation of 35 degree F product temperature in cooler and -10 degree F product temperature in freezer.

Refrigeration system shall be provided with outdoor remote air cooled condensing units located outdoors on building roof.

Condensing units shall be provided with winterized controls (low ambient package) including crankcase heater, line dryer, head pressure control, and galvanized steel stand with stainless steel weather hood.

Provide all hangers and brackets as required to install refrigeration lines.

Construction Trade shall furnish all sleeves and openings through walls for passage of refrigeration lines.

Roofing Trade shall provide waterproof roof opening for passage of refrigeration lines.

Foodservice Equipment Contractor shall furnish materials and inter-wire defrost time clock circuit for walk-in freezer, from condensing unit to evaporator coil.

Foodservice Equipment Contractor shall furnish materials and install (wrap and insulate with foam pipe insulation) heat tracing tape to evaporator coil condensate line in walk-in freezer.

Food Service Equipment Contractor shall furnish and install copper tubing and extend evaporator coil condensate line to floor receptacle.

Set and adjust all temperature and defrost cycles.

Provide start-up and two year material and labor warranty on entire refrigeration system and five years manufacturer's warranty on compressor.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #77	EVAPORATOR, WALK-IN COOLER
Quantity:	One (1)
Manufacturer:	American Panel / Norbec / Arctic
Model:	BEL0115BS6AM
Remarks:	Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #78	CONDENSING UNIT, WALK-IN COOLER
Quantity:	One (1)
Manufacturer:	American Panel / Norbec / Arctic
Model:	FFAP-A20Z-TFC-075
Remarks:	Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #79	EVAPORATOR, WALK-IN FREEZER
Quantity:	One (1)
Manufacturer:	American Panel / Norbec / Arctic

Model:	BEL0130BS6EE
Remarks:	Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #80	CONDENSING UNIT, WALK-IN FREEZER
Quantity:	One (1)
Manufacturer:	American Panel / Norbec / Arctic
Model:	FFAL-A30Z-TFC-075
Remarks:	Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #81	WORK TABLE, STAINLESS STEEL TOP W/ PREP SINK
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	T30144STE
Options:	E36A Welded base E22 Sink bowl, weld in 341189 Twist handle drain -TB bracket 351585 Sink cover E47 Sink cover holder YCORSI-502971-MOD Drawer DOS10132-14/3 Double overshelf

ITEM #82	WORK TABLE, STAINLESS STEEL TOP
Quantity:	Two (2)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	T3054SE
Options:	E36A Welded base (2) E59 Undershelf upgrade (2) DOS1048-14/3 Double overshelf (2)

ITEM #83	EXHAUST HOOD
Quantity:	One (1)
Manufacturer:	Captive Aire / Caddy / Avtec
Model:	Size and shape as per plan
Construction:	Furnish and install exhaust hood with integral plenum box make-air system.

Entire exhaust ventilation system shall be constructed in compliance with UL, NSF, NFPA, IMC 2018 (including automatic start-up of the exhaust and supply ventilation upon activation of any cooking appliance) and any prevailing statutes and codes.

Hood shall be 20’-11” long constructed in two sections of 18 gauge 304 stainless steel with all seams continuously welded, ground smooth and polished. First section is 10’, second section is 10’-11”. Hood mounted utility cabinet is 1’. Provide a full compliment of stainless steel “high efficiency” Captrate Solo baffle type grease extractors.

Furnish remote bulb thermostat with watertight hardware and install in either the exhaust plenum of the hood or in the exhaust duct. Provide NEMA 3 control panel box with hinged front cover complete with supply and exhaust fan contactors wired to an adjustable thermostat control, field wiring terminal strip and on-off switch.

Provide 18 gauge 304 stainless steel supply and exhaust duct collar.

Provide 18 gauge 304 stainless steel insulated supply air plenum box assembly with internal air volume control damper integral along the face of the hood. Mount in finished ceiling along face of hood and furnish full length stainless steel perforated removable panels for discharge of supply air along entire face of hood.

Provide stainless steel threaded hanger rods complete with stainless steel mounting hardware for securing to structural ceiling.

Mechanical (HVAC) Trade shall furnish and install a complete exhaust air handling system including exhaust fan and controller, fan start-stop switch with status lights, 16 gauge insulated welded ductwork from exhaust collar on exhaust hood to fan, hinged roof curb with grease trough and removable grease container.

Mechanical (HVAC) Trade shall install exhaust hood heat detector(s) in exhaust hoods with multiple exhaust collars in the exhaust duct just after the point of the pant leg juncture; this includes punching of the required hole in the duct and installation of the heat detector and fitting.

Mechanical (HVAC) Trade shall furnish and install a complete supply air handling system including supply fan and controller (with maintainable filter system) and supply air heater with thermostat control (to temper incoming supply air below 65 degree F ambient), fan start-stop switch with indicator lights, galvanized steel ductwork from supply collar on exhaust hood to fan and roof curb.

Electrical Trade shall furnish and install interconnecting wiring between fan motors, controllers and switches.

Electrical Trade shall furnish and install inter-wiring of cooking appliance start-up inter-lock device and the supply and exhaust ventilation system and wire per the manufacturer’s instructions and per applicable codes.

Furnish four (4) UL listed vapor-proof recessed LED light fixtures wired to a common on-off switch with stainless steel cover plate located in hood mounted utility cabinet.

Electrical Trade shall furnish materials and inter-wire light fixtures to hood mounted utility cabinet.

Mechanical (HVAC) Trade shall furnish and install INVERTER DUTY THREE PHASE exhaust fan and controller.

Mechanical (HVAC) Trade shall furnish fans set compatible with variable frequency drive specification.

Electrical Trade shall furnish and install Interconnecting wiring of the system between the exhaust hood sensors, remote frequency drive unit and exhaust and supply fan motors.

Furnish and install 18 gauge stainless steel ceiling closure panels extending from the top of the exhaust ventilator to the finished ceiling. Panels shall be removable without the use of tools for access.

Furnish and install 18 gauge 304 stainless steel wall panels extending from the bottom of the rear of the exhaust hood to the upper edge of the baseboard molding and extending along the full length of all wall surfaces. Wall panel sections shall be fitted with ½" wide off-set seams at intermediate joints to allow panel sections to fit tightly against the wall and to result in watertight seams. Secure wall panels to building wall with wall panel adhesive of proper type for wall construction. Seal end seams with General Electric or equivalent clear silicone sealer.

Electrical Trade shall provide the inter-wiring between the control enclosure, fire system, supply and exhaust fans and variable frequency drives and duct riser temperature switch.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #83.1 HOOD CONTROL PANEL
Quantity: One (1)
Manufacturer: Captive Aire / Caddy / Avtec
Model: Size and shape per plan
Sup Info: Furnish 18 gauge stainless steel utility and fire system enclosure cabinet with hinged access doors for both hood and fire system controls and fire suppression tanks. System shall be listed by ETL (UL 508A) NSF, NFPA, IMC 2018 and any prevailing statutes or codes including automatic shut-down of all cooking appliances per code section 44 of NFPA 17-27. Cabinet may be freestanding wall type or integral with exhaust hood as shown on the contract drawings. Furnish stainless steel mounting hardware of proper type for wall construction for wall mounted cabinet.

Furnish and install variable volume motor control center with variable frequency drive, input / output processor and keypad enclosed within a stainless steel utility cabinet for remote mounting. System shall include, but not be limited to, electronic variable volume motor starters with thermal overload, input / output processors, control keypad, temperature and optic sensors and plug and play cables. Temperature sensor shall be mounted in the exhaust duct collar; optic sensor shall be mounted inside the ends of the hood with air purge units mounted on top.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #83.2 FIRE PROTECTION SYSTEM
Quantity: One (1)
Manufacturer: Captive Aire
Model: TANK
Sup Info: Furnish and install in exhaust hood, plenum and surface fire protection system.

TANK Fire Suppression is a pre-engineered, stored-pressure wet chemical solutionextinguishing system.

TANK Fire Suppression System shall be UL & ULC listed in accordance with UL300,UL1254, ULCORD-C1254.6.

Microprocessor-based control board shall be ETL Listed to UL Standard 864 and CAN/ULC-S527-11.

TANK Fire Suppression System intended for installation and for use in accordance withthe National Fire Protection Association Standards:

7. Wet Chemical Extinguishing Systems, NFPA 17A
8. National Electrical Code, NFPA 70
9. National Fire Alarm & Signaling Code, NFPA 72

New York City and FDNY approved under COA# 5870.

California State Fire Marshal (CFSM), Listing No. 7085-2199:0502.

A pre-engineered, fixed pipe, automatic wet chemical agent fire suppression system forprotection of all hazard areas associated with cooking operations, including exhaust hoods, plenums, ductwork, and cooking appliances.

Exhaust hood fire system components to be factory installed.

Cylinder and Valve Assembly

47. The cylinders shall have a tin-nickel alloy plated brass valve with pressure gauge.
48. Wet chemical agent shall be contained in one or more stored pressure DOT/TC ratedsteel cylinder and valve assemblies.
49. Each cylinder is factory-filled with liquid fire suppressant and pressurized to 200 PSIGat 70°F.

Distribution Nozzles

50. Nozzles shall be located to protect the exhaust ducts, plenums, and all cookingappliances requiring protection.
51. All nozzles shall be equipped with a metal blow off cap. The cap prevents contamination from entering the pipe network and is designed to pop-off upon system discharge, allowing agent to flow to the protected hazard area.

52. All nozzles shall incorporate a stamped part number to easily identify nozzle type.

Distribution System

53. The distribution system shall consist of Copper, Schedule 40 black iron, chrome-plated or stainless-steel pipe and fittings. All exposed piping and fittings must be chrome-plated or stainless steel.

54. Fittings shall be minimum class 150. Galvanized fittings shall not be used.

Suppression System

55. The system control equipment shall be capable of all functions associated with automatically and manually discharging the wet chemical agent from all cylinder andvalve assemblies, including automatic shutdown of the heat source or fuel and electrical power to all protected areas upon system discharge.

56. Liquid Fire Suppressant shall be Aqueous Potassium Carbonate (APC).

57. All mechanical components of the actuator kit shall be enclosed.

58. The actuator kit shall be capable of automatic or manual activation means.

59. Supervisory Pressure Switch added to monitor operating system pressure.

60. For manual activation, an electrically operated manual release shall be used toactuate the system manually.

61. For automatic activation, the system will be activated by a Firestat (heat) detector.

Electrical

62. Electrical Division to provide shunt trip breakers at main power panel, or disconnects,as designated by the Electrical Engineer; interconnection provided at hood control panel for the signal to shut down all electricity in and under the exhaust hood. Shunt trips/disconnects to accomplish shut off of electricity in the event of fire system activation by others.

63. Printed circuit board with microprocessor-based controller that provides all the necessary monitoring, timing, and supervision functions required for the reliableoperation of the fire system.

64. Independent supervised loops incorporate redundancy and fault detection.

65. Real-time cloud-based monitoring connection provided with system by ownership.

66. Primary power supply, with battery backup for power loss.

67. All wiring must be in accordance to NFPA 70 and the Authority Having Jurisdiction(AHJ).

68. Electric gas valve provided for equipment below exhaust hood. Coordinate size andinstallation with Plumbing Division.

69. All wiring is to be in accordance with the applicable manufacturer's instructions for thefire alarm control panel, gas shut-off valve, manual reset relay, and contractor supplied shut-off devices.

As part of this item, provide wall mounted type K handheld portable fire extinguisher, placard, and mounting bracket as required in the immediate vicinity of each

cooking area,per NFPA-96 and NFPA-10. Additional fire extinguishers as required in the kitchen area are to be specified by the Architect and provided by the General Contractor.

Inter-wiring of the fire system to the exhaust hood shall be furnished and installed by the Electrical Trade.

Provide as part of fire system, electrically operated gas supply line shut-off valve (two required for “loop” gas service) to interrupt gas supply to all gas operated cooking appliances. Gas valve shall be provided with manual reset to prevent gas flow to pilot devices on appliances prior to restart.

Provide one remote manual pull station to actuate fire system in the event of a fire.

Plumbing Trade shall install gas shut-off valve(s) in gas supply line.

Electrical Trade shall inter-wire gas shut-off valve(s) to fire system.

Electrical Trade shall furnish and install electric shunt-trip circuit breakers or electric shut-off contactors to interrupt electric power to all electrically operated cooking appliances.

Provide dry contacts in fire system to interface with building fire alarm system as required, electrical tie-in shall be the responsibility of the Electrical Trade.

Provide as part of fire system, start-up testing of the fire system as required by local fire codes. Subsequent testing of the fire system for a period of one year after start-up shall be included as part of this contract.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

Install in accordance with manufacturer's instructions, drawings, written specifications,manufacturer’s installation manual, and all applicable building codes.

Six-month and twelve-month inspections, servicing, and replacement of components asper NFPA 96 to be provided by the General Contractor or Owner.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #84 OVEN, DECK TYPE

Quantity:	One (1)
Manufacturer:	Doyon / Revent / Baxter
Model:	2T2
Options:	Built as modular, per deck High: 8" high interior, for bottom deck High: 8" high interior, for top deck 1" refractory stone deck, standard ARTISANBRUSH Cleaning brush

ITEM #85	WORK TABLE, STAINLESS STEEL
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	T30144SE
Options:	E36A Welded base E59 Undershelf upgrade YCORSI-502971-MOD Drawer (3)

ITEM #86	SHELF, WALL MOUNT
Quantity:	Two (2)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	WSP1284-14/3
Sup Info:	Furnish stainless steel mounting hardware of proper type for wall construction and to sustain weight while in use. Construction Trade shall provide wall blocking as required for mounting.

ITEM #87	POT RACK, WALL MOUNT
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	WM72PR
Sup Info:	Includes (12) double pronged pot hooks. Furnish stainless steel mounting hardware of proper type for wall construction and to sustain weight while in use. Construction Trade shall provide wall blocking as required for mounting.

ITEM #88	THREE COMPARTMENT SINK
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	FN2860-3-30-14/3
Options:	313296 Pre-rinse faucet 313297 Add-a-faucet 301190 Pre-rinse wall bracket 313294 Splash mount faucet 341189 Twist handle drain (3) -TB Twist bracket (3) 326271 Sink cover (3)

E47 Sink cover holder
E41A Disposal provision package

ITEM #89 POT RACK, WALL MOUNT
Quantity: One (1)
Manufacturer: Eagle Group / John Boos / Advance Tabco
Model: WM36PR
Sup Info: Includes (6) double pronged pot hooks.

Furnish stainless steel mounting hardware of proper type for wall construction and to sustain weight while in use.

Construction Trade shall provide wall blocking as required for mounting.

ITEM #90 EXHAUST HOOD
Quantity: One (1)
Manufacturer: Captive Aire / Caddy / Avtec
Model: Size and shape as per plan
Construction: Furnish and install exhaust hood with integral plenum box make-air system.

Entire exhaust ventilation system shall be constructed in compliance with UL, NSF, NFPA, IMC 2018 (including automatic start-up of the exhaust and supply ventilation upon activation of any cooking appliance) and any prevailing statutes and codes.

Hood shall be 9'-6" long constructed in one equal sections of 18 gauge 304 stainless steel with all seams continuously welded, ground smooth and polished. Hood mounted utility cabinet is 1'. Provide a full compliment of stainless steel "high efficiency" Captrate Solo baffle type grease extractors.

Furnish remote bulb thermostat with watertight hardware and install in either the exhaust plenum of the hood or in the exhaust duct. Provide NEMA 3 control panel box with hinged front cover complete with supply and exhaust fan contactors wired to an adjustable thermostat control, field wiring terminal strip and on-off switch.

Provide 18 gauge 304 stainless steel supply and exhaust duct collar.

Provide 18 gauge 304 stainless steel insulated supply air plenum box assembly with internal air volume control damper integral along the face of the hood. Mount in finished ceiling along face of hood and furnish full length stainless steel perforated removable panels for discharge of supply air along entire face of hood.

Provide stainless steel threaded hanger rods complete with stainless steel mounting hardware for securing to structural ceiling.

Mechanical (HVAC) Trade shall furnish and install a complete exhaust air handling system including exhaust fan and controller, fan start-stop switch with status lights, 16 gauge insulated welded ductwork from exhaust collar on exhaust hood to fan, hinged roof curb with grease trough and removable grease container.

Mechanical (HVAC) Trade shall install exhaust hood heat detector(s) in exhaust hoods with multiple exhaust collars in the exhaust duct just after the point of the pant leg juncture; this includes punching of the required hole in the duct and installation of the heat detector and fitting.

Mechanical (HVAC) Trade shall furnish and install a complete supply air handling system including supply fan and controller (with maintainable filter system) and supply air heater with thermostat control (to temper incoming supply air below 65 degree F ambient), fan start-stop switch with indicator lights, galvanized steel ductwork from supply collar on exhaust hood to fan and roof curb.

Electrical Trade shall furnish and install interconnecting wiring between fan motors, controllers and switches.

Electrical Trade shall furnish and install inter-wiring of cooking appliance start-up inter-lock device and the supply and exhaust ventilation system and wire per the manufacturer's instructions and per applicable codes.

Furnish three (3) UL listed vapor-proof recessed LED light fixtures wired to a common on-off switch with stainless steel cover plate located in hood mounted utility cabinet.

Electrical Trade shall furnish materials and inter-wire light fixtures to hood mounted utility cabinet.

Mechanical (HVAC) Trade shall furnish and install INVERTER DUTY THREE PHASE exhaust fan and controller.

Mechanical (HVAC) Trade shall furnish fans set compatible with variable frequency drive specification.

Electrical Trade shall furnish and install Interconnecting wiring of the system between the exhaust hood sensors, remote frequency drive unit and exhaust and supply fan motors.

Furnish and install 18 gauge stainless steel ceiling closure panels extending from the top of the exhaust ventilator to the finished ceiling. Panels shall be removable without the use of tools for access.

Furnish and install 18 gauge 304 stainless steel wall panels extending from the bottom of the rear of the exhaust hood to the upper edge of the baseboard molding and extending along the full length of all wall surfaces. Wall panel sections shall be fitted with ½" wide off-set seams at intermediate joints to allow panel sections to fit tightly against the wall and to result in watertight seams. Secure wall panels to building wall with wall panel adhesive of proper type for wall construction. Seal end seams with General Electric or equivalent clear silicone sealer.

Electrical Trade shall provide the inter-wiring between the control enclosure, fire system, supply and exhaust fans and variable frequency drives and duct riser temperature switch.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #90.1 HOOD CONTROL PANEL
Quantity: One (1)
Manufacturer: Captive Aire / Caddy / Avtec
Model: Size and shape per plan
Sup Info: Furnish 18 gauge stainless steel utility and fire system enclosure cabinet with hinged access doors for both hood and fire system controls and fire suppression tanks. System shall be listed by ETL (UL 508A) NSF, NFPA, IMC 2018 and any prevailing statutes or codes including automatic shut-down of all cooking appliances per code section 44 of NFPA 17-27. Cabinet may be freestanding wall type or integral with exhaust hood as shown on the contract drawings. Furnish stainless steel mounting hardware of proper type for wall construction for wall mounted cabinet.

Furnish and install variable volume motor control center with variable frequency drive, input / output processor and keypad enclosed within a stainless steel utility cabinet for remote mounting. System shall include, but not be limited to, electronic variable volume motor starters with thermal overload, input / output processors, control keypad, temperature and optic sensors and plug and play cables. Temperature sensor shall be mounted in the exhaust duct collar; optic sensor shall be mounted inside the ends of the hood with air purge units mounted on top.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #90.2 FIRE PROTECTION SYSTEM
Quantity: One (1)
Manufacturer: Captive Aire
Model: TANK
Sup Info: Furnish and install in exhaust hood, plenum and surface fire protection system.

TANK Fire Suppression is a pre-engineered, stored-pressure wet chemical solutionextinguishing system.

TANK Fire Suppression System shall be UL & ULC listed in accordance with UL300,UL1254, ULCORD-C1254.6.

Microprocessor-based control board shall be ETL Listed to UL Standard 864 and CAN/ULC-S527-11.

TANK Fire Suppression System intended for installation and for use in accordance

withthe National Fire Protection Association Standards:

10. Wet Chemical Extinguishing Systems, NFPA 17A
11. National Electrical Code, NFPA 70
12. National Fire Alarm & Signaling Code, NFPA 72

New York City and FDNY approved under COA# 5870.

California State Fire Marshal (CFSM), Listing No. 7085-2199:0502.

A pre-engineered, fixed pipe, automatic wet chemical agent fire suppression system forprotection of all hazard areas associated with cooking operations, including exhaust hoods, plenums, ductwork, and cooking appliances.

Exhaust hood fire system components to be factory installed.

Cylinder and Valve Assembly

70. The cylinders shall have a tin-nickel alloy plated brass valve with pressure gauge.
71. Wet chemical agent shall be contained in one or more stored pressure DOT/TC ratedsteel cylinder and valve assemblies.
72. Each cylinder is factory-filled with liquid fire suppressant and pressurized to 200 PSIGat 70°F.

Distribution Nozzles

73. Nozzles shall be located to protect the exhaust ducts, plenums, and all cookingappliances requiring protection.
74. All nozzles shall be equipped with a metal blow off cap. The cap prevents contamination from entering the pipe network and is designed to pop-off upon system discharge, allowing agent to flow to the protected hazard area.
75. All nozzles shall incorporate a stamped part number to easily identify nozzle type.

Distribution System

76. The distribution system shall consist of Copper, Schedule 40 black iron, chrome-plated or stainless-steel pipe and fittings. All exposed piping and fittings must be chrome-plated or stainless steel.
77. Fittings shall be minimum class 150. Galvanized fittings shall not be used.

Suppression System

78. The system control equipment shall be capable of all functions associated with automatically and manually discharging the wet chemical agent from all cylinder andvalve assemblies, including automatic shutdown of the heat source or fuel and electrical power to all protected areas upon system discharge.
79. Liquid Fire Suppressant shall be Aqueous Potassium Carbonate (APC).
80. All mechanical components of the actuator kit shall be enclosed.
81. The actuator kit shall be capable of automatic or manual activation means.
82. Supervisory Pressure Switch added to monitor operating system pressure.

83. For manual activation, an electrically operated manual release shall be used toactuate the system manually.

84. For automatic activation, the system will be activated by a Firestat (heat) detector.

Electrical

85. Electrical Division to provide shunt trip breakers at main power panel, or disconnects,as designated by the Electrical Engineer; interconnection provided at hood control panel for the signal to shut down all electricity in and under the exhaust hood. Shunt trips/disconnects to accomplish shut off of electricity in the event of fire system activation by others.

86. Printed circuit board with microprocessor-based controller that provides all the necessary monitoring, timing, and supervision functions required for the reliableoperation of the fire system.

87. Independent supervised loops incorporate redundancy and fault detection.

88. Real-time cloud-based monitoring connection provided with system by ownership.

89. Primary power supply, with battery backup for power loss.

90. All wiring must be in accordance to NFPA 70 and the Authority Having Jurisdiction(AHJ).

91. Electric gas valve provided for equipment below exhaust hood. Coordinate size andinstallation with Plumbing Division.

92. All wiring is to be in accordance with the applicable manufacturer's instructions for thefire alarm control panel, gas shut-off valve, manual reset relay, and contractor supplied shut-off devices.

As part of this item, provide wall mounted type K handheld portable fire extinguisher, placard, and mounting bracket as required in the immediate vicinity of each cooking area,per NFPA-96 and NFPA-10. Additional fire extinguishers as required in the kitchen area are to be specified by the Architect and provided by the General Contractor.

Inter-wiring of the fire system to the exhaust hood shall be furnished and installed by the Electrical Trade.

Provide as part of fire system, electrically operated gas supply line shut-off valve (two required for "loop" gas service) to interrupt gas supply to all gas operated cooking appliances. Gas valve shall be provided with manual reset to prevent gas flow to pilot devices on appliances prior to restart.

Provide one remote manual pull station to actuate fire system in the event of a fire.

Plumbing Trade shall install gas shut-off valve(s) in gas supply line.

Electrical Trade shall inter-wire gas shut-off valve(s) to fire system.

Electrical Trade shall furnish and install electric shunt-trip circuit breakers or electric shut-off contactors to interrupt electric power to all electrically operated cooking appliances.

Provide dry contacts in fire system to interface with building fire alarm system as required, electrical tie-in shall be the responsibility of the Electrical Trade.

Provide as part of fire system, start-up testing of the fire system as required by local fire codes. Subsequent testing of the fire system for a period of one year after start-up shall be included as part of this contract.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

Install in accordance with manufacturer's instructions, drawings, written specifications,manufacturer’s installation manual, and all applicable building codes.

Six-month and twelve-month inspections, servicing, and replacement of components asper NFPA 96 to be provided by the General Contractor or Owner.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #91	FRYER
Quantity:	One (1)
Manufacturer:	Frymaster / Pitco / Vulcan
Model:	FPPH255
Options:	8030002 Filter powder 8030170 Filter paper 8239116 Sediment filter screen 8030103 Sediment tray 8030197 Clean-out rod 8236559 Splash shield 8030429 Fryer brush 8239416 Frypot cover 8233938 Crumb scoop CM3.5 Controller, standard 6” casters Gas pressure regulator Rear gas manifold FWH-1A French fry warmer and holding station (with heat lamp) Spreader cabinet with cutout in top Holding pan with screen for spreader cabinet

	Natural gas Dormont 16100KITCF2S-48 gas hose kit
Sup Info:	Foodservice Equipment Contractor shall install disconnect at wall and to cooking appliance per manufacturer's instructions. Foodservice Equipment Contractor shall provide and secure restraining cable between wall and equipment.
ITEM #92	GRIDDLE, COUNTERTOP
Quantity:	One (1)
Manufacturer:	Garland / Vulcan / Imperial
Model:	GTGG36-GT36M
Options:	Gas pressure regulator Dormont 1675KITCF2S48 Gas hose kit
Sup Info:	Foodservice Equipment Contractor shall install disconnect at wall connection and to cooking appliance per manufacturer's instructions. Foodservice Equipment Contractor shall provide and secure restraining cable between wall and equipment.
ITEM #93	REFRIGERATED EQUIPMENT STAND
Quantity:	One (1)
Manufacturer:	Continental / Victory / True
Model:	D36GN
Options:	Flat top Stainless steel interior Stainless steel exterior Stainless steel case back Exterior mounted digital thermometer Automatic condensate evaporator Swivel casters with polyurethane tires and front locking brakes Plug and cord set
ITEM #94	FOUR OPEN BURNER RANGE
Quantity:	Two (2)
Manufacturer:	Garland / Vulcan / Imperial
Model:	G24-4L
Options:	Stainless steel sides (2) Stainless steel back (2) Rear gas connection (2) Stainless steel manifold covers (2) Manifold end caps (2) Swivel casters with polyurethane tires and front locking brakes (2 sets) Gas pressure regulator (2) Dormont 1675KIT48PS gas hose kit (2)
Sup Info:	Foodservice Equipment Contractor shall install disconnect at wall connection and to cooking appliance per manufacturer's instructions.

Foodservice Equipment Contractor shall provide and secure restraining cable between wall and equipment.

ITEM #95 COMBI-OVEN
Quantity: Two (2)
Manufacturer: Alto-Shaam / Convotherm / Angelo Po
Model: CTP7-20G OVER CTP7-20G
Options: 5021522 Installation kit (2)
Natural gas (4)
Removeable single-point temperature probe (4)
Doors hinged right, standard (2)
COMBILIQUICLEAN Automatic liquid cleaning system (2)
CE-36457 Liquid cleaner (2)
CE-27889 Deliming product (2)
BH-38059 Cleanoutbrush (2)
SC-47403 Oven scraper (2)
BS-26730 Fry basket (4)
5016707 Stacking hardware (2)
5017391 Mobile stacking base (2)
Gas pressure regulator (4)
5015711 Mobile oven stand (2)
1675KITCF2S48PS Dormont gas hose kit (4)
W50BP2Q48 Dormont water hose kit (8)
Sup Info: Kitchen Equipment Contractor shall install disconnect at wall and to cooking appliance per manufacturer's instructions.

Kitchen Equipment Contractor shall provide and secure restraining cable between wall and equipment.

ITEM #96 FLOOR TROUGH
Quantity: One (1)
Manufacturer: Eagle Group / John Boos / Advance Tabco
Model: ASFT-2430-SG
Sup Info: Construction Trade shall provide floor recess and install floor pan in recess flush with adjacent kitchen floor in a watertight manner.

ITEM #97 REFRIGERATOR, UNDERCOUNTER
Quantity: One (1)
Manufacturer: Continental / Victory / True
Model: SW60N24M-FB
Options: Stainless steel interior
Stainless steel exterior
Stainless steel case back
Field reversible doors
Exterior mounted digital thermometer
Automatic condensate evaporator
Swivel casters with polyurethane tires and front locking brakes
Plug and cord set

ITEM #98 CHEF'S COUNTER
Quantity: One (1)
Manufacturer: Eagle Group / John Boos / Advance Tabco
Model: Custom
Construction: Furnish and install chef's counter assembly with 14 gauge stainless steel top with 2" diameter rolled edges with bullnosed corners.

Counter base shall be fabricated of 18 gauge stainless steel wrap around type construction. Provide stainless steel fully welded channel frame around the entire perimeter of the counter top with intermediate cross bracing extending front to rear on centers not to exceed 24" to support top. Provide interior of counter base with solid fixed open bottom and intermediate shelves constructed of 16 gauge stainless steel unless specified otherwise. The front edge of each shelf shall be turned down 2" at 90 degrees and returned 1/2" at 90 degrees. Rear and ends shall be turned up 2" high on a 90 degree angle, interior corners coved on 3/4" radius.

Sink section shall be furnished with one 12" x 15" x 8" deep stainless steel sink fabricated of 14 gauge stainless steel with all interior corners coved on a 3/4" radius, both horizontally and vertically, forming spherical corners. Sink shall be fabricated as an integral part of fixture with sink fully welded with adjacent top, welds ground smooth and polished.

Provide and install Component Hardware E38-1012 basket type drain assembly with stainless steel crumb cup stopper.

Punch top and provide T&S Brass & Bronze Works B-222 faucet with aerator.

Provide counter base below sink with 18 gauge stainless steel hinged apron. Below apron provide 16 gauge stainless steel double pan hinged access door with stainless steel recessed handle. Base below sink shall have bottom and rear open for passage of plumbing lines.

Chefs counter shall be provided with open plate storage cabinet along counter front. Plate cabinet shelves shall be fixed bottom and intermediate fabricated of 18 gauge stainless steel. Front edge shall be turned down 1-1/2" at 90 degrees, returned 1/2" at 90 degrees. Rear and ends shall be turned up 2" at 90 degrees with interior corners coved on a 1/2" radius. Shelf shall be weld anchored to cabinet body. Bottom shelf shall be fabricated flush with front mullions with fully welded facing junctures presenting seamless construction. Fixed intermediate shelves shall be designed similar to bottom shelf except front edge shall be set behind vertical mullions and fully welded thereto. Top of plate storage cabinet shall be 34" high overall with top of chefs counter turned down 2" at 90 degrees into top of plate storage cabinet.

Provide full length 16" wide two tier overshelf constructed of 18 gauge stainless steel with 1-1/2" diameter rolled edges with bullnose corners. Lower shelf shall be 16" above table surface, upper shelf shall be 12" above lower shelf. Shelf shall be mounted on 1-1/4" diameter 16 gauge stainless steel tubular uprights, fully welded,

ground smooth and polished to equipment top. Along bottom of shelf, uprights shall be fully welded to 1" X 4" X 1"; 14 gauge stainless steel "hat" type mounting channels. Tack weld mounting channel front to rear along underside of shelf on centers not to exceed 48". Provide longitudinal reinforcing channels constructed identical to mounting channels, weld to same and extend full length along center of shelf between mounting channels. Furnish and factory install to underside of upper shelf, Hatco GRH infra-red heat lamps with built-in infinite control and pilot light.

Provide provisions for Item #72 drop-in hot/cold/freeze.

Provide provisions for Item #97 refrigerated sandwich unit.

Provide provisions for Item #138 heat lamp.

Provide working side of cabinet base with stainless steel NEMA 4 electrical panel box with main and individual circuit breakers for all related electrical appliances and components. The panel box shall be provided with shunt-trip circuit breakers for all electrically operated cooking appliances. All appliances and components to be furnished as built-in equipment as part of the counter shall be factory installed per the manufacturers instructions, all electrical wiring and components shall conform to UL and shall be installed in accordance with the National Electric Code. The entire counter assembly shall bear the UL seal.

Mount counter assembly on 12 gauge stainless steel triangular leg gusset mounting channels on centers not to exceed 48" in length and fully welded to the cabinet body. Mount counter assembly on 6” high 1 5/8” diameter 16 gauge stainless steel tubular legs with stainless steel adjustable bullet feet fully weld legs to mounting gussets.

ITEM #99	ICE BIN
Quantity:	One (1)
Manufacturer:	Follet / Hoshizaki / Manitowoc
Model:	DEV1080SG-60
Options:	ABICEPADDL46 Ice paddle 00146365 Guardian scoop system

ITEM #100	ICE MAKER
Quantity:	One (1)
Manufacturer:	Hoshizaki / Manitowoc / Ice-O-Matic
Model:	KM-1100MAH

ITEM #100F	ICE MAKER WATER FILTER
Quantity:	One (1)
Manufacturer:	Everpure / 3M / Optipure
Model:	QC7I TWIN 7FC5-S EV969371 Replacement cartridge
Sup Info:	Foodservice Equipment Contractor shall install ice maker filter system in water supply line and furnish and install interconnecting piping between water filter and ice maker water inlet.

ITEM #101	WORK TABLE, STAINLESS STEEL TOP W/ DOUBLE PREP SINK
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	T3084S-BS
Options:	E36A Welded base E59 Undershelf upgrade E22 Sink bowl, weld in (2) 341189 Twist handle drain (2) -TB bracket (2) 351585 Sink cover (2) E47 Sink cover holder YCORSI-502971-MOD Drawer

ITEM #102	ICE CADDY
Quantity:	One (1)
Manufacturer:	Cambro / Carlisle
Model:	ICS125L110

ITEM #103	SODA SYSTEM
Quantity:	One (1)
Sup Info:	Not in Foodservice Equipment contract, furnished by the Owner.

ITEM #104	SODA/ICE DISPENSER
Quantity:	One (1)
Sup Info:	Not in Foodservice Equipment contract, furnished by the Owner.

ITEM #105	WORK TABLE, STAINLESS STEEL TOP W/ DOUBLE PREP SINK
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	BEV30120SE-10BS/L

ITEM #106	TEA BREWER
Quantity:	One (1)
Manufacturer:	Bunn-O-Matic
Model:	36700.0009
Options:	34100.0002 Dispenser

ITEM #106F	TEA BREWER WATER FILTER
Quantity:	One (1)
Manufacturer:	Everpure / 3M / Optipure
Model:	QC7I SINGLE 4FC-S EV969231 Replacement cartridge (primary filter)
Sup Info:	Foodservice Equipment Contractor shall install tea brewer filter system in water supply line and furnish and install interconnecting piping between water filter and tea brewer water inlet.

ITEM #107 COFFEE BREWER

Quantity: One (1)
Manufacturer: Bunn-O-Matic
Model: 39200.0000
Options: 39400.0001 Thermal server

ITEM #107F COFFEE BREWER WATER FILTER
Quantity: One (1)
Manufacturer: Everpure / 3M / Optipure
Model: QC7I SINGLE 7FC5-S
EV969371 Replacement cartridge (primary filter)
EV953426 Replacement cartridge (prefilter)
Sup Info: Foodservice Equipment Contractor shall install tea brewer filter system in water supply line and furnish and install interconnecting piping between water filter and tea brewer water inlet.

ITEM #108 REFRIGERATOR, UNDERCOUNTER
Quantity: Sixteen (16)
Manufacturer: Continental / Victory / True
Model: SW27N-U
Options: Stainless steel interior (16)
Stainless steel exterior (16)
Stainless steel case back (16)
Field reversible doors (16)
Exterior mounted digital thermometer (16)
Automatic condensate evaporator (16)
Swivel casters with polyurethane tires and front locking brakes (16)
Plug and cord set (16)

ITEM #109 CAN RACK
Quantity: Two (2)
Manufacturer: Eagle Group / John Boos / Advance Tabco
Model: CRC4

ITEM #110 UTILITY DISTRIBUTION SYSTEM
Quantity: One (1)
Manufacturer: Captive Aire / Caddy / Avtec
Model: Size and shape per plan
Construction: Furnish and install utility distribution system.

Utility distribution system shall be fabricated in accordance with UL, NSF, NEC, IMC 2015.

Utility distribution system shall be fabricated of a minimum of 18 gauge 304 stainless steel consisting of two utility compartments and fabricated in sections as required with factory pre-assembled field connections and furnished with one primary end riser with single point connection for all utilities and one secondary end riser.

Primary riser shall be furnished with built-in exhaust hood controls, including push

button fan control switches with status lights, individual and shunt-trip main circuit breaker and emergency "kill" button with guard.

Provide as part of raceway exhaust hood interlock device to prevent all electrically and gas operated cooking appliances from operating unless the supply and exhaust fans of the exhaust hood is operating as required by all local and prevailing codes including IMC 2015.

Provide raceway with splash proof electrical chase with copper wire-way wired to a circuit breaker panel box with ground fault protection for each appliance in the primary end riser, and UL listed power cords and matching electrical receptacles as required.

Provide raceway with gas supply (looped) service with shut-off valves for each disconnect hose or connection and safety retainer cables for each mobile appliance. Provide as part of utility distribution system, mechanically operated gas supply line shut-off valves to interrupt gas supply to all gas operated cooking appliances. Gas valves shall be provided with manual reset to prevent gas flow to pilot devices on appliances prior to restart.

Provide raceway with hot and cold water service with shut-off valves for each disconnect hose or connection and safety retainer cables for each mobile appliance.

Provide each riser with ventilator connecting collars for positive connection to the exhaust hood.

Provide secondary end riser with hinged access door for mounting of gas supply line shut-off valve (looped gas service).

Furnish and install labor and material to assemble all internal interconnecting gas piping, water piping and electrical wiring to install the utility distribution system. Test all connections for leaks.

ITEM #111	WORK TABLE, ENCLOSED BASE
Quantity:	Seven (7)
Manufacturer:	Eagle group / John Boos / Advance Tabco
Model:	Size and shape per plan
Construction:	Top shall be fabricated of 14 gauge stainless steel. Exposed edges shall be rolled down 2" diameter at 180 degrees. Provide backsplash along adjoining surfaces with top turned up integrally 6" high on a 3/4" radius at a 90 degree angle, turned back 1" on a 90 degree angle and down 1/2" on a 90 degree angle.

Cabinet body shall be fabricated of 18 gauge stainless steel wrap around construction. The backs of front stiles shall be closed with tight fitting channel sections of 18 gauge stainless steel, welded in place and closed on top and bottom.

Provide sink section(s) with 14" x 16" x 10" deep sink fabricated of 14 gauge stainless steel with all interior corners coved on a 3/4" radius, both horizontally and verti-

cally, forming spherical corners. Sink shall be fabricated as an integral part of fixture with sink fully welded with adjacent top, welds ground smooth and polished. Sinks shall be facing in towards ranges on each side.

Punch top and provide T&S Brass & Bronze Works B-300 double pantry faucet(s) with gooseneck nozzle and aerator.

Furnish and install Component Hardware D50-7215 lever type drain assemblies with connected overflow and stainless steel flat strainer plate.

Provide counter base below sink with stainless steel apron with recess for lever waste handle. Below apron provide stainless steel, double pan hinged access door with stainless steel recessed handle. Access doors shall be behind the undercounter refrigerators on both sides. Base below sink shall have bottom and rear open for passage of plumbing lines.

Provide provisions for Item #108 undercounter refrigerators on each side of the table, facing opposite of each other.

Provide cutout/provisions for Item #132 2-range burners (qty 4 for each table).

Provide remainder of cabinet base with open fixed bottom and intermediate fabricated shelves fabricated of 18 gauge stainless steel. Front edge shall be turned down 1-1/2" at 90 degrees, returned 1/2" at 90 degrees. Rear and ends shall be turned up 2" at 90 degrees with interior corners coved on a 3/4" radius. Shelf shall be weld anchored to cabinet body. Bottom shelf shall be fabricated flush with front mullions with fully welded facing junctures presenting seamless construction. Fixed intermediate shelves shall be designed similar to bottom shelf except front edge shall be set behind vertical mullions and fully welded thereto.

Mount on counter type stainless steel conical shaped die-formed legs with stainless steel, bullet shaped adjustable foot fully welded to leg mounting channel.

Refer to elevations on FS-1.2 for detail.

ITEM #112	SOILED DISHTABLE
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	SDTL-96-14/3
Options	-SRP Dishtable kit, includes scrap basket, rack slide and T&S pre-rinse

ITEM #113	DISHWASHER, CONVEYOR TYPE
Quantity:	One (1)
Manufacturer:	Hobart / Champion / Stero
Model:	CL44EN-ADV4+BUILDUP
Options:	CL44EN-ADVHTE15K Electric tank heat 15kW CL44EN-ADVERH30K 30kW electric booster

CL44EN-ADVELE0AX 208v/60/3-ph
SGLPT-KIT4-CLE Single point electrical connection
HOBINST-SGLPT-CLE Accessory installation
CL44EN-ADVHGTSTD Standard height
CL44EN-ADVDIR0RL Right to left operation
CL44EN-ADVFETSTD Standard feet
PRESREG-1/20BR Brass pressure regulator
1/2INSHK-ABSRBR Water shock absorber kit
CLE/TBL-SWITCH Table limit switch CLE-Series
Exhaust fan activation switch

ITEM #114 CONDENSATE HOOD
Quantity: One (1)
Manufacturer: Captive Aire / Caddy / Avtec
Model: Size and shape per plan
Construction: Furnish and install condensate hood.

Entire condensate ventilation system shall be constructed in compliance with UL, NSF and any prevailing statutes and codes.

Fabricate entire hood of 18 gauge 304 stainless steel fully welded watertight construction.

Provide stainless steel welded hanger mounting clips with threaded stainless steel hanger and structural ceiling providing necessary angles and channels and utilizing stainless steel mounting hardware.

Mechanical (HVAC) Trade shall provide stainless steel welded ductwork (horizontal duct runs shall be pitched back toward condensate hood) and fan to comprise a complete condensate exhaust system.

Electrical Trade shall install fan switch with indicator lights located on dish machine and inter-wire to fan.

Furnish and install plastic drain tubing from nipple on bleeder drain outlet to soiled dishtable top surface.

Furnish and install 18 gauge stainless steel ceiling closure panels extending from the top of the exhaust ventilator to the finished ceiling. Panels shall be removable without the use of tools for access.

Furnish and install 18 gauge 304 stainless steel wall panels extending from the bottom of the rear of the exhaust hood to the upper edge of the baseboard molding and extending along the full length of all wall surfaces. Wall panel sections shall be fitted with ½" wide off-set seams at intermediate joints to allow panel sections to fit tightly against the wall and to result in watertight seams. Secure wall panels to building wall with wall panel adhesive of proper type for wall construction. Seal end seams with General Electric or equivalent clear silicone sealer.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #115	CLEAN DISHTABLE
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	CDTR-60-14/3
Options:	E120 Table limit switch provision

ITEM #116	HAND SINK, DROP-IN
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	SR10-14-9.5-1
Options:	Standard faucet Faucet hole punched on 4” centers, standard DP-10 Wall mounted Eagle paper towel and soap dispenser

ITEM #117	WORK TABLE, STAINLESS STEEL TOP
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	T36144SE
Options:	E36A Welded base E59 Undershelf upgrade YCORSI-502971-MOD Drawer (3) DOS10132-14/3 Double overshelf (center)

ITEM #118	AIRPOT
Quantity:	Four (4)
Manufacturer:	Bunn-O-Matic
Model:	32125.0000
ITEM #119	DISPLAY, NON-REFRIGERATED
Quantity:	One (1)
Manufacturer:	Equipex / Structural Concepts / Federal
Model:	TN583

ITEM #120	FRONT COUNTER
Quantity:	One (1)
Manufacturer:	Duke / Multiteria / Delfield
Model:	Size and shape per plan
Construction:	Fabricate counter top of solid surface material. Material shall be fabricated and assembled per manufacturers approved methods utilizing a factory authorized and certified fabricator and installer. The edges of the top shall be formed as indicated. Openings shall have radius corners and shall be reinforced with additional material. Counter base shall be fabricated of 18 gauge stainless steel wrap around type construction. Provide stainless steel fully welded channel frame around the entire perimeter of the counter top with intermediate cross bracing extending front to rear on cen-

ters not to exceed 24” to support top. Provide interior of counter base with solid fixed open bottom and intermediate shelves constructed of 16 gauge stainless steel unless specified otherwise. The front edge of each shelf shall be turned down 2" at 90 degrees and returned 1/2" at 90 degrees. Rear and ends shall be turned up 2" high on a 90 degree angle, interior corners coved on 3/4" radius.

Hinged doors shall be fabricated of ¾” thick MDF board and shall be furnished with three BLUM 75M5580 or 75M5680 European style concealed hinges. Door pulls shall be Hafele 116.39.437. Finish doors with laminated plastic on all edges and interior and exterior face. Doors shall not exceed 27" in width and shall be of equal size. Provide each door with chrome plated cylinder locks keyed alike.

All appliances and components to be furnished as built-in equipment as part of the counter shall be factory installed per the manufacturer’s instructions, all electrical wiring and components shall conform to UL and shall be installed in accordance with the National Electric Code with all wiring extended to a junction box connection point in counter base with all wires tagged and identified.

Provide provisions for Item #108 undercounter refrigerator.

Provide provisions for Item #116 drop-in sink.

Provide provisions for Item #123 undercounter refrigerator.

Furnish utility chases through counter body and die-raised openings in counter top for passage of plumbing and utility lines.

Provide 12 gauge stainless steel 1" x 5" x 1" “hat” type leg mounting channels extending full width of counter on centers not to exceed 48" in length and fully welded to the angle iron frame. Mount counter assembly on 6" high stainless steel counter type conical legs with stainless steel adjustable bullet feet fully welded to leg mounting channels.

Counter front and exposed ends shall be provided with high pressure laminated plastic faced panels close fitted with hairline joints and secured in position in a concealed manner and removable without the use of tools. Laminate selection to be made by the Architect/Owner.

Provide 6” high recessed toe base on customers side and exposed ends fabricated of 18 gauge 304 stainless steel and secured to counter base for removal without tools.

ITEM #121 CONDIMENT COUNTER
Quantity: Two (2)
Manufacturer: Duke / Multiteria / Delfield
Model: Size and shape per plan
Construction: Fabricate counter top of solid surface material. Material shall be fabricated and assembled per manufacturers approved methods utilizing a factory authorized and certi-

fied fabricator and installer. The edges of the top shall be formed as indicated. Openings shall have radius corners and shall be reinforced with additional material.

Counter base shall be fabricated of 18 gauge stainless steel wrap around type construction. Provide stainless steel fully welded channel frame around the entire perimeter of the counter top with intermediate cross bracing extending front to rear on centers not to exceed 24” to support top. Provide interior of counter base with solid fixed open bottom and intermediate shelves constructed of 16 gauge stainless steel unless specified otherwise. The front edge of each shelf shall be turned down 2" at 90 degrees and returned 1/2" at 90 degrees. Rear and ends shall be turned up 2" high on a 90 degree angle, interior corners coved on 3/4" radius.

Hinged doors shall be fabricated of ¾” thick MDF board and shall be furnished with three BLUM 75M5580 or 75M5680 European style concealed hinges. Door pulls shall be Hafele 116.39.437. Finish doors with laminated plastic on all edges and interior and exterior face. Doors shall not exceed 27" in width and shall be of equal size. Provide each door with chrome plated cylinder locks keyed alike.

Furnish one 20" hole in countertop for trash as shown on plans. Line the entire opening perimeter with laminated plastic in finish as the counter top and furnish hole with an 18 gauge type 304 stainless steel removable sleeve to line opening. Each sleeve shall have a 1/2" flange around the perimeter of the top and shall be 1-1/2" high overall.

Furnish utility chases through counter body and die-raised openings in counter top for passage of plumbing and utility lines.

Provide 12 gauge stainless steel 1" x 5" x 1" “hat” type leg mounting channels extending full width of counter on centers not to exceed 48" in length and fully welded to the angle iron frame. Mount counter assembly on 6" high stainless steel counter type conical legs with stainless steel adjustable bullet feet fully welded to leg mounting channels.

Counter front and exposed ends shall be provided with high pressure laminated plastic faced panels close fitted with hairline joints and secured in position in a concealed manner and removable without the use of tools. Laminate selection to be made by the Architect/Owner.

Provide 6” high recessed toe base on customers side and exposed ends fabricated of 18 gauge 304 stainless steel and secured to counter base for removal without tools.

ITEM #122 COMMERCIAL WASTE CONTAINER
Quantity: Two (2)
Manufacturer: Rubbermaid
Model: FG263200GRAY
FG263100GRAY Lid (2)
FG264000BLA Dolly (2)

ITEM #123	REFRIGERATOR, UNDERCOUNTER
Quantity:	One (1)
Manufacturer:	Continental / Victory / True
Model:	SW36N-U
Options:	Stainless steel interior
	Stainless steel exterior
	Stainless steel case back
	Field reversible doors
	Exterior mounted digital thermometer
	Automatic condensate evaporator
	Swivel casters with polyurethane tires and front locking brakes
	Plug and cord set

ITEM #124	SOLID TOP UNIT
Quantity:	Four (4)
Manufacturer:	Duke/ Multiteria / Delfield
Model:	TST-32SS
Options:	Owner/Architect to select laminate finish (4)
	MOD-12-32 Extend top – Custom size 38” (4)
	TDST-X-2 Recessed top (4)
	SOLID-HD-2CU Tray slide, customer side (4)
	MOD-2S-2CU Kick plate, customer side (4)

ITEM #125	SIDE LOADER
Quantity:	One (1)
Manufacturer:	Hobart / Champion / Stero
Model:	SL23/E-NOHDLR

ITEM #126	WIRE SHELVING
Quantity:	Three (3)
Manufacturer:	Metro / Eagle group / Quantum
Model:	PR2442NK3 (12)
Options:	70UPK3 Posts (12)
	5MP Casters (6)
	5MPB Casters (6)
Sup Info:	Assemble into four tier shelving units, locate bottom shelf 12” above floor.

ITEM #127	SNEEZE GUARD, STATIONARY
Quantity:	Eight (8)
Manufacturer:	BSI / Premier Brass / English
Model:	ZG9930
	Stainless steel tubing, posts and framing (8)
	3/8" Tempered glass (8)
	End panels (8)
	705 Stealth Warmer & Light Combo (8)
	Remote Infinite (8)
	SSU5-N Stainless steel undercounter mount (8)

ITEM #128 EXHAUST HOOD
Quantity: Seven (7)
Manufacturer: Captive Aire / Caddy / Avtec
Model: Size and shape as per plan
Construction: Furnish and install exhaust hood with integral plenum box make-air system.

Entire exhaust ventilation system shall be constructed in compliance with UL, NSF, NFPA, IMC 2018 (including automatic start-up of the exhaust and supply ventilation upon activation of any cooking appliance) and any prevailing statutes and codes.

Hood shall be 6' long island configuration constructed in one equal sections of 18 gauge 304 stainless steel with all seams continuously welded, ground smooth and polished. Provide a full compliment of stainless steel "high efficiency" Captrate Solo baffle type grease extractors.

Furnish remote bulb thermostat with watertight hardware and install in either the exhaust plenum of the hood or in the exhaust duct. Provide NEMA 3 control panel box with hinged front cover complete with supply and exhaust fan contactors wired to an adjustable thermostat control, field wiring terminal strip and on-off switch.

Provide 18 gauge 304 stainless steel supply and exhaust duct collar.

Provide 18 gauge 304 stainless steel insulated supply air plenum box assembly with internal air volume control damper integral along the face of the hood. Mount in finished ceiling along face of hood and furnish full length stainless steel perforated removable panels for discharge of supply air along entire face of hood.

Provide stainless steel threaded hanger rods complete with stainless steel mounting hardware for securing to structural ceiling.

Mechanical (HVAC) Trade shall furnish and install a complete exhaust air handling system including exhaust fan and controller, fan start-stop switch with status lights, 16 gauge insulated welded ductwork from exhaust collar on exhaust hood to fan, hinged roof curb with grease trough and removable grease container.

Mechanical (HVAC) Trade shall install exhaust hood heat detector(s) in exhaust hoods with multiple exhaust collars in the exhaust duct just after the point of the pant leg juncture; this includes punching of the required hole in the duct and installation of the heat detector and fitting.

Mechanical (HVAC) Trade shall furnish and install a complete supply air handling system including supply fan and controller (with maintainable filter system) and supply air heater with thermostat control (to temper incoming supply air below 65 degree F ambient), fan start-stop switch with indicator lights, galvanized steel ductwork from supply collar on exhaust hood to fan and roof curb.

Electrical Trade shall furnish and install interconnecting wiring between fan motors, controllers and switches.

Electrical Trade shall furnish and install inter-wiring of cooking appliance start-up inter-lock device and the supply and exhaust ventilation system and wire per the manufacturer's instructions and per applicable codes.

Furnish three (3) UL listed vapor-proof recessed LED light fixtures wired to a common on-off switch with stainless steel cover plate located in control box..

Electrical Trade shall furnish materials and inter-wire light fixtures to wall mounted control panel.

Mechanical (HVAC) Trade shall furnish and install INVERTER DUTY THREE PHASE exhaust fan and controller.

Mechanical (HVAC) Trade shall furnish fans set compatible with variable frequency drive specification.

Electrical Trade shall furnish and install Interconnecting wiring of the system between the exhaust hood sensors, remote frequency drive unit and exhaust and supply fan motors.

Furnish and install 18 gauge stainless steel ceiling closure panels extending from the top of the exhaust ventilator to the finished ceiling. Panels shall be removable without the use of tools for access.

Electrical Trade shall provide the inter-wiring between the control enclosure, fire system, supply and exhaust fans and variable frequency drives and duct riser temperature switch.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #128.1	HOOD CONTROL PANEL
Quantity:	One (1)
Manufacturer:	Captive Aire / Caddy / Avtec
Model:	Size and shape per plan
Sup Info:	Furnish 18 gauge stainless steel utility and fire system enclosure cabinet with hinged access doors for both hood and fire system controls and fire suppression tanks. System shall be listed by ETL (UL 508A) NSF, NFPA, IMC 2018 and any prevailing statutes or codes including automatic shut-down of all cooking appliances per code section 44 of NFPA 17-27. Cabinet may be freestanding wall type or integral with exhaust hood as shown on the contract drawings. Furnish stainless steel mounting hardware of proper type for wall construction for wall mounted cabinet.

Furnish and install variable volume motor control center with variable frequency drive, input / output processor and keypad enclosed within a stainless steel utility cabinet for remote mounting. System shall include, but not be limited to, electronic variable volume motor starters with thermal overload, input / output processors, con-

trol keypad, temperature and optic sensors and plug and play cables. Temperature sensor shall be mounted in the exhaust duct collar; optic sensor shall be mounted inside the ends of the hood with air purge units mounted on top.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #128.2 FIRE PROTECTION SYSTEM
Quantity: One (1)
Manufacturer: Captive Aire
Model: TANK
Sup Info: Furnish and install in exhaust hood, plenum and surface fire protection system.

TANK Fire Suppression is a pre-engineered, stored-pressure wet chemical solutionextinguishing system.

TANK Fire Suppression System shall be UL & ULC listed in accordance with UL300,UL1254, ULCORD-C1254.6.

Microprocessor-based control board shall be ETL Listed to UL Standard 864 and CAN/ULC-S527-11.

TANK Fire Suppression System intended for installation and for use in accordance withthe National Fire Protection Association Standards:

13. Wet Chemical Extinguishing Systems, NFPA 17A
14. National Electrical Code, NFPA 70
15. National Fire Alarm & Signaling Code, NFPA 72

New York City and FDNY approved under COA# 5870.

California State Fire Marshal (CFSM), Listing No. 7085-2199:0502.

A pre-engineered, fixed pipe, automatic wet chemical agent fire suppression system forprotection of all hazard areas associated with cooking operations, including exhaust hoods, plenums, ductwork, and cooking appliances.

Exhaust hood fire system components to be factory installed.

Cylinder and Valve Assembly

93. The cylinders shall have a tin-nickel alloy plated brass valve with pressure gauge.
94. Wet chemical agent shall be contained in one or more stored pressure DOT/TC ratedsteel cylinder and valve assemblies.
95. Each cylinder is factory-filled with liquid fire suppressant and pressurized to 200 PSIGat 70°F.

Distribution Nozzles

96. Nozzles shall be located to protect the exhaust ducts, plenums, and all cookingappliances requiring protection.

97. All nozzles shall be equipped with a metal blow off cap. The cap prevents contamination from entering the pipe network and is designed to pop-off upon system discharge, allowing agent to flow to the protected hazard area.

98. All nozzles shall incorporate a stamped part number to easily identify nozzle type.

Distribution System

99. The distribution system shall consist of Copper, Schedule 40 black iron, chrome-plated or stainless-steel pipe and fittings. All exposed piping and fittings must be chrome-plated or stainless steel.

100. Fittings shall be minimum class 150. Galvanized fittings shall not be used.

Suppression System

101. The system control equipment shall be capable of all functions associated with automatically and manually discharging the wet chemical agent from all cylinder andvalve assemblies, including automatic shutdown of the heat source or fuel and electrical power to all protected areas upon system discharge.

102. Liquid Fire Suppressant shall be Aqueous Potassium Carbonate (APC).

103. All mechanical components of the actuator kit shall be enclosed.

104. The actuator kit shall be capable of automatic or manual activation means.

105. Supervisory Pressure Switch added to monitor operating system pressure.

106. For manual activation, an electrically operated manual release shall be used toactuate the system manually.

107. For automatic activation, the system will be activated by a Firestat (heat) detector.

Electrical

108. Electrical Division to provide shunt trip breakers at main power panel, or disconnects,as designated by the Electrical Engineer; interconnection provided at hood control panel for the signal to shut down all electricity in and under the exhaust hood. Shunt trips/disconnects to accomplish shut off of electricity in the event of fire system activation by others.

109. Printed circuit board with microprocessor-based controller that provides all the necessary monitoring, timing, and supervision functions required for the reliableoperation of the fire system.

110. Independent supervised loops incorporate redundancy and fault detection.

111. Real-time cloud-based monitoring connection provided with system by ownership.

112. Primary power supply, with battery backup for power loss.

113. All wiring must be in accordance to NFPA 70 and the Authority Having Jurisdiction(AHJ).

114. Electric gas valve provided for equipment below exhaust hood. Coordinate size andinstallation with Plumbing Division.

115. All wiring is to be in accordance with the applicable manufacturer's instructions for thefire alarm control panel, gas shut-off valve, manual reset relay, and contractor supplied shut-off devices.

As part of this item, provide wall mounted type K handheld portable fire extinguisher, placard, and mounting bracket as required in the immediate vicinity of each cooking area,per NFPA-96 and NFPA-10. Additional fire extinguishers as required in the kitchen area are to be specified by the Architect and provided by the General Contractor.

Inter-wiring of the fire system to the exhaust hood shall be furnished and installed by the Electrical Trade.

Provide as part of fire system, electrically operated gas supply line shut-off valve (two required for "loop" gas service) to interrupt gas supply to all gas operated cooking appliances. Gas valve shall be provided with manual reset to prevent gas flow to pilot devices on appliances prior to restart.

Provide one remote manual pull station to actuate fire system in the event of a fire.

Plumbing Trade shall install gas shut-off valve(s) in gas supply line.

Electrical Trade shall inter-wire gas shut-off valve(s) to fire system.

Electrical Trade shall furnish and install electric shunt-trip circuit breakers or electric shut-off contactors to interrupt electric power to all electrically operated cooking appliances.

Provide dry contacts in fire system to interface with building fire alarm system as required, electrical tie-in shall be the responsibility of the Electrical Trade.

Provide as part of fire system, start-up testing of the fire system as required by local fire codes. Subsequent testing of the fire system for a period of one year after start-up shall be included as part of this contract.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

Install in accordance with manufacturer's instructions, drawings, written specifications,manufacturer's installation manual, and all applicable building codes.

Six-month and twelve-month inspections, servicing, and replacement of compo-

nents asper NFPA 96 to be provided by the General Contractor or Owner.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #129 WORK TABLE, ENCLOSED BASE
Quantity: Seven (7)
Manufacturer: Eagle group / John Boos / Advance Tabco
Model: Size and shape per plan
Construction: Top shall be fabricated of 14 gauge stainless steel. Exposed edges shall be rolled down 2" diameter at 180 degrees. Provide backsplash along adjoining surfaces with top turned up integrally 6" high on a 3/4" radius at a 90 degree angle, turned back 1" on a 90 degree angle and down 1/2" on a 90 degree angle.

Cabinet body shall be fabricated of 18 gauge stainless steel wrap around construction. The backs of front stiles shall be closed with tight fitting channel sections of 18 gauge stainless steel, welded in place and closed on top and bottom.

Provide sink section with 16" x 20" x 8" deep sink fabricated of 14 gauge stainless steel with all interior corners coved on a 3/4" radius, both horizontally and vertically, forming spherical corners. Sink shall be fabricated as an integral part of fixture with sink fully welded with adjacent top, welds ground smooth and polished.

Punch top and provide T&S Brass & Bronze Works B-300 double pantry faucet with gooseneck nozzle and aerator.

Furnish and install Component Hardware D50-7215 lever type drain assembly with connected overflow and stainless steel flat strainer plate.

Provide counter base below sink with stainless steel apron with recess for lever waste handle. Below apron provide stainless steel, double pan hinged access door with stainless steel recessed handle. Base below sink shall have bottom and rear open for passage of plumbing lines.

Provide provisions for Item #108 undercounter refrigerator.

Provide cutout/provisions for Item #94 4-range burner.

Provide remainder of cabinet base with open fixed bottom and intermediate fabricated shelves fabricated of 18 gauge stainless steel. Front edge shall be turned down 1-1/2" at 90 degrees, returned 1/2" at 90 degrees. Rear and ends shall be turned up 2" at 90 degrees with interior corners coved on a 3/4" radius. Shelf shall be weld anchored to cabinet body. Bottom shelf shall be fabricated flush with front mullions with fully welded facing junctures presenting seamless construction. Fixed intermediate shelves shall be designed similar to bottom shelf except front edge shall be set behind vertical mullions and fully welded thereto.

Mount on counter type stainless steel conical shaped die-formed legs with stainless

steel, bullet shaped adjustable foot fully welded to leg mounting channel.

ITEM #130	REACH-IN REFRIGERATOR
Quantity:	Two (2)
Manufacturer:	Continental / Victory / True
Model:	2RNSS
Options:	Stainless steel interior (2) Stainless steel exterior (2) Stainless steel case back (2) Field reversible doors (2) Exterior mounted digital thermometer (2) Automatic condensate evaporator (2) Swivel casters with polyurethane tires and front locking brakes (2 sets) Plug and cord set (2) Pan slides on top sections (2) Shelves on bottom sections (2)

ITEM #131	EXHAUST HOOD
Quantity:	One (1)
Manufacturer:	Captive Aire / Caddy / Avtec
Model:	Size and shape as per plan
Construction:	Furnish and install exhaust hood with integral plenum box make-air system.

Entire exhaust ventilation system shall be constructed in compliance with UL, NSF, NFPA, IMC 2018 (including automatic start-up of the exhaust and supply ventilation upon activation of any cooking appliance) and any prevailing statutes and codes.

Hood shall be 5’ long island configuration constructed in one equal sections of 18 gauge 304 stainless steel with all seams continuously welded, ground smooth and polished. Provide a full compliment of stainless steel “high efficiency” Captrate Solo baffle type grease extractors.

Furnish remote bulb thermostat with watertight hardware and install in either the exhaust plenum of the hood or in the exhaust duct. Provide NEMA 3 control panel box with hinged front cover complete with supply and exhaust fan contactors wired to an adjustable thermostat control, field wiring terminal strip and on-off switch.

Provide 18 gauge 304 stainless steel supply and exhaust duct collar.

Provide 18 gauge 304 stainless steel insulated supply air plenum box assembly with internal air volume control damper integral along the face of the hood. Mount in finished ceiling along face of hood and furnish full length stainless steel perforated removable panels for discharge of supply air along entire face of hood.

Provide stainless steel threaded hanger rods complete with stainless steel mounting hardware for securing to structural ceiling.

Mechanical (HVAC) Trade shall furnish and install a complete exhaust air handling system including exhaust fan and controller, fan start-stop switch with status lights, 16 gauge insulated welded ductwork from exhaust collar on exhaust hood to fan, hinged roof curb with grease trough and removable grease container.

Mechanical (HVAC) Trade shall install exhaust hood heat detector(s) in exhaust hoods with multiple exhaust collars in the exhaust duct just after the point of the pant leg juncture; this includes punching of the required hole in the duct and installation of the heat detector and fitting.

Mechanical (HVAC) Trade shall furnish and install a complete supply air handling system including supply fan and controller (with maintainable filter system) and supply air heater with thermostat control (to temper incoming supply air below 65 degree F ambient), fan start-stop switch with indicator lights, galvanized steel ductwork from supply collar on exhaust hood to fan and roof curb.

Electrical Trade shall furnish and install interconnecting wiring between fan motors, controllers and switches.

Electrical Trade shall furnish and install inter-wiring of cooking appliance start-up inter-lock device and the supply and exhaust ventilation system and wire per the manufacturer's instructions and per applicable codes.

Furnish three (3) UL listed vapor-proof recessed LED light fixtures wired to a common on-off switch with stainless steel cover plate located in control box..

Electrical Trade shall furnish materials and inter-wire light fixtures to wall mounted control panel.

Mechanical (HVAC) Trade shall furnish and install INVERTER DUTY THREE PHASE exhaust fan and controller.

Mechanical (HVAC) Trade shall furnish fans set compatible with variable frequency drive specification.

Electrical Trade shall furnish and install Interconnecting wiring of the system between the exhaust hood sensors, remote frequency drive unit and exhaust and supply fan motors.

Furnish and install 18 gauge stainless steel ceiling closure panels extending from the top of the exhaust ventilator to the finished ceiling. Panels shall be removable without the use of tools for access.

Electrical Trade shall provide the inter-wiring between the control enclosure, fire system, supply and exhaust fans and variable frequency drives and duct riser temperature switch.

Refer to latest approved Engineering Drawings for engineering data and design

methods and features which shall take precedence to this specification.

ITEM #131.1 HOOD CONTROL PANEL
Quantity: One (1)
Manufacturer: Captive Aire / Caddy / Avtec
Model: Size and shape per plan
Sup Info: Furnish 18 gauge stainless steel utility and fire system enclosure cabinet with hinged access doors for both hood and fire system controls and fire suppression tanks. System shall be listed by ETL (UL 508A) NSF, NFPA, IMC 2018 and any prevailing statutes or codes including automatic shut-down of all cooking appliances per code section 44 of NFPA 17-27. Cabinet may be freestanding wall type or integral with exhaust hood as shown on the contract drawings. Furnish stainless steel mounting hardware of proper type for wall construction for wall mounted cabinet.

Furnish and install variable volume motor control center with variable frequency drive, input / output processor and keypad enclosed within a stainless steel utility cabinet for remote mounting. System shall include, but not be limited to, electronic variable volume motor starters with thermal overload, input / output processors, control keypad, temperature and optic sensors and plug and play cables. Temperature sensor shall be mounted in the exhaust duct collar; optic sensor shall be mounted inside the ends of the hood with air purge units mounted on top.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #131.2 FIRE PROTECTION SYSTEM
Quantity: One (1)
Manufacturer: Captive Aire
Model: TANK
Sup Info: Furnish and install in exhaust hood, plenum and surface fire protection system.

TANK Fire Suppression is a pre-engineered, stored-pressure wet chemical solutionextinguishing system.

TANK Fire Suppression System shall be UL & ULC listed in accordance with UL300,UL1254, ULCORD-C1254.6.

Microprocessor-based control board shall be ETL Listed to UL Standard 864 and CAN/ULC-S527-11.

TANK Fire Suppression System intended for installation and for use in accordance withthe National Fire Protection Association Standards:

16. Wet Chemical Extinguishing Systems, NFPA 17A
17. National Electrical Code, NFPA 70
18. National Fire Alarm & Signaling Code, NFPA 72

New York City and FDNY approved under COA# 5870.
California State Fire Marshal (CFSM), Listing No. 7085-2199:0502.

A pre-engineered, fixed pipe, automatic wet chemical agent fire suppression system forprotection of all hazard areas associated with cooking operations, including exhaust hoods, plenums, ductwork, and cooking appliances.

Exhaust hood fire system components to be factory installed.

Cylinder and Valve Assembly

116. The cylinders shall have a tin-nickel alloy plated brass valve with pressure gauge.
117. Wet chemical agent shall be contained in one or more stored pressure DOT/TC ratedsteel cylinder and valve assemblies.
118. Each cylinder is factory-filled with liquid fire suppressant and pressurized to 200 PSIGat 70°F.

Distribution Nozzles

119. Nozzles shall be located to protect the exhaust ducts, plenums, and all cookingappliances requiring protection.
120. All nozzles shall be equipped with a metal blow off cap. The cap prevents contamination from entering the pipe network and is designed to pop-off upon system discharge, allowing agent to flow to the protected hazard area.
121. All nozzles shall incorporate a stamped part number to easily identify nozzle type.

Distribution System

122. The distribution system shall consist of Copper, Schedule 40 black iron, chrome-plated or stainless-steel pipe and fittings. All exposed piping and fittings must be chrome-plated or stainless steel.
123. Fittings shall be minimum class 150. Galvanized fittings shall not be used.

Suppression System

124. The system control equipment shall be capable of all functions associated with automatically and manually discharging the wet chemical agent from all cylinder andvalve assemblies, including automatic shutdown of the heat source or fuel and electrical power to all protected areas upon system discharge.
125. Liquid Fire Suppressant shall be Aqueous Potassium Carbonate (APC).
126. All mechanical components of the actuator kit shall be enclosed.
127. The actuator kit shall be capable of automatic or manual activation means.
128. Supervisory Pressure Switch added to monitor operating system pressure.
129. For manual activation, an electrically operated manual release shall be used toactuate the system manually.
130. For automatic activation, the system will be activated by a Firestat (heat) detector.

Electrical

131. Electrical Division to provide shunt trip breakers at main power panel, or disconnects,as designated by the Electrical Engineer; interconnection provided at hood control panel for the signal to shut down all electricity in and under the exhaust hood. Shunt trips/disconnects to accomplish shut off of electricity in the event of fire system activation by others.

132. Printed circuit board with microprocessor-based controller that provides all the necessary monitoring, timing, and supervision functions required for the reliableoperation of the fire system.

133. Independent supervised loops incorporate redundancy and fault detection.

134. Real-time cloud-based monitoring connection provided with system by ownership.

135. Primary power supply, with battery backup for power loss.

136. All wiring must be in accordance to NFPA 70 and the Authority Having Jurisdiction(AHJ).

137. Electric gas valve provided for equipment below exhaust hood. Coordinate size andinstallation with Plumbing Division.

138. All wiring is to be in accordance with the applicable manufacturer's instructions for thefire alarm control panel, gas shut-off valve, manual reset relay, and contractor supplied shut-off devices.

As part of this item, provide wall mounted type K handheld portable fire extinguisher, placard, and mounting bracket as required in the immediate vicinity of each cooking area,per NFPA-96 and NFPA-10. Additional fire extinguishers as required in the kitchen area are to be specified by the Architect and provided by the General Contractor.

Inter-wiring of the fire system to the exhaust hood shall be furnished and installed by the Electrical Trade.

Provide as part of fire system, electrically operated gas supply line shut-off valve (two required for "loop" gas service) to interrupt gas supply to all gas operated cooking appliances. Gas valve shall be provided with manual reset to prevent gas flow to pilot devices on appliances prior to restart.

Provide one remote manual pull station to actuate fire system in the event of a fire.

Plumbing Trade shall install gas shut-off valve(s) in gas supply line.

Electrical Trade shall inter-wire gas shut-off valve(s) to fire system.

Electrical Trade shall furnish and install electric shunt-trip circuit breakers or electric shut-off contactors to interrupt electric power to all electrically operated cooking appliances.

Provide dry contacts in fire system to interface with building fire alarm system as required, electrical tie-in shall be the responsibility of the Electrical Trade.

Provide as part of fire system, start-up testing of the fire system as required by local fire codes. Subsequent testing of the fire system for a period of one year after start-up shall be included as part of this contract.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

Install in accordance with manufacturer's instructions, drawings, written specifications,manufacturer’s installation manual, and all applicable building codes.

Six-month and twelve-month inspections, servicing, and replacement of components asper NFPA 96 to be provided by the General Contractor or Owner.

Refer to latest approved Engineering Drawings for engineering data and design methods and features which shall take precedence to this specification.

ITEM #132	2-BURNER, GAS
Quantity:	Twenty-Eight (28)
Manufacturer:	Electrolux / Garland / Vulcan
Model:	169101
Options:	Natural gas 1675KITCF2S48PS
Sup Info:	Foodservice Equipment Contractor shall install disconnect at point of gas connection and to cooking appliance per manufacturer’s instructions.

ITEM #133	COMBI-OVEN, VENTLESS
Quantity:	Two (2)
Manufacturer:	Alto-Shaam / Convotherm / Angelo Po
Model:	CTP6-10E/CTP10-10E W/ VENT HOOD
Options:	5021519 Installation kit (4) 6-10EVH PLUS Ventech PLUS Type 1 hood (2) FI-24114 Charcoal filter for hood (2) FI-24113 Washable grease filter (2) FI-46923 Front condensing coil (2) Wifi standard (4) Removable "T" style temperature probe, standard (4) COMBILIQUICLEAN Automatic liquid cleaning system (2) CE-46869 Oven cleaner, liquid soap injection cleaner (2) CP-46870 Liquid dispensing cap (2) CE-46991 Concentrated oven cleaner (2) CE-46829 Non caustic cleaner (2)

BH-38059 Clean out brush (2)
SC-47403 Oven scraper (2)
5030719 Stacking hardware (2)
5017404 Mobile stacking base (2)
Polyurethane tires and front locking brakes (2 sets)
Dormont W50BP48 Water hose kit (4)

Sup Info: Foodservice Equipment Contractor shall install disconnect at wall connection and to cooking appliance per manufacturer's instructions.

Foodservice Equipment Contractor shall provide and secure restraining cable between wall and equipment.

ITEM #134 DROP-IN REFRIGERATED DISPLAY CASE, SELF CONTAINED
Quantity: Four (4)
Manufacturer: Federal Industries / Structural Concepts / RPI
Model: ITR3634-SC
Options: Stainless steel shelving, per tier (4)
Reflective ends (pair) (4)
Removable sliding rear doors, standard (4)

ITEM #135 POT RACK, CEILING MOUNTED
Quantity: Two (2)
Manufacturer: Eagle Group / John Boos / Advance Tabco
Model: CM144PR
Sup Info: Furnish stainless steel mounting hardware of proper type for wall construction and to sustain weight while in use.

Construction Trade shall provide wall blocking as required for mounting.

ITEM #136 UTILITY DISTRIBUTION SYSTEM
Quantity: One (1)
Manufacturer: Captive Aire / Caddy / Avtec
Model: Size and shape per plan
Construction: Furnish and install utility distribution system.

Utility distribution system shall be fabricated in accordance with UL, NSF, NEC, IMC 2015.

Utility distribution system shall be fabricated of a minimum of 18 gauge 304 stainless steel consisting of two utility compartments and fabricated in sections as required with factory pre-assembled field connections and furnished with one primary end riser with single point connection for all utilities and one secondary end riser.

Primary riser shall be furnished with built-in exhaust hood controls, including push button fan control switches with status lights, individual and shunt-trip main circuit breaker and emergency "kill" button with guard.

Provide as part of raceway exhaust hood interlock device to prevent all electrically

and gas operated cooking appliances from operating unless the supply and exhaust fans of the exhaust hood is operating as required by all local and prevailing codes including IMC 2015.

Provide raceway with splash proof electrical chase with copper wire-way wired to a circuit breaker panel box with ground fault protection for each appliance in the primary end riser, and UL listed power cords and matching electrical receptacles as required.

Provide raceway with gas supply (looped) service with shut-off valves for each disconnect hose or connection and safety retainer cables for each mobile appliance. Provide as part of utility distribution system, mechanically operated gas supply line shut-off valves to interrupt gas supply to all gas operated cooking appliances. Gas valves shall be provided with manual reset to prevent gas flow to pilot devices on appliances prior to restart.

Provide raceway with hot and cold water service with shut-off valves for each disconnect hose or connection and safety retainer cables for each mobile appliance.

Provide each riser with ventilator connecting collars for positive connection to the exhaust hood.

Provide secondary end riser with hinged access door for mounting of gas supply line shut-off valve (looped gas service).

Furnish and install labor and material to assemble all internal interconnecting gas piping, water piping and electrical wiring to install the utility distribution system. Test all connections for leaks.

ITEM #137 UTILITY DISTRIBUTION SYSTEM
Quantity: One (1)
Manufacturer: Captive Aire / Caddy / Avtec
Model: Size and shape per plan
Construction: Furnish and install utility distribution system.

Utility distribution system shall be fabricated in accordance with UL, NSF, NEC, IMC 2015.

Utility distribution system shall be fabricated of a minimum of 18 gauge 304 stainless steel consisting of two utility compartments and fabricated in sections as required with factory pre-assembled field connections and furnished with one primary end riser with single point connection for all utilities and one secondary end riser.

Primary riser shall be furnished with built-in exhaust hood controls, including push button fan control switches with status lights, individual and shunt-trip main circuit breaker and emergency “kill” button with guard.

Provide as part of raceway exhaust hood interlock device to prevent all electrically

and gas operated cooking appliances from operating unless the supply and exhaust fans of the exhaust hood is operating as required by all local and prevailing codes including IMC 2015.

Provide raceway with splash proof electrical chase with copper wire-way wired to a circuit breaker panel box with ground fault protection for each appliance in the primary end riser, and UL listed power cords and matching electrical receptacles as required.

Provide raceway with gas supply (looped) service with shut-off valves for each disconnect hose or connection and safety retainer cables for each mobile appliance. Provide as part of utility distribution system, mechanically operated gas supply line shut-off valves to interrupt gas supply to all gas operated cooking appliances. Gas valves shall be provided with manual reset to prevent gas flow to pilot devices on appliances prior to restart.

Provide raceway with hot and cold water service with shut-off valves for each disconnect hose or connection and safety retainer cables for each mobile appliance.

Provide each riser with ventilator connecting collars for positive connection to the exhaust hood.

Provide secondary end riser with hinged access door for mounting of gas supply line shut-off valve (looped gas service).

Furnish and install labor and material to assemble all internal interconnecting gas piping, water piping and electrical wiring to install the utility distribution system. Test all connections for leaks.

ITEM #138	WARMER, FOOD OVERHEAD
Quantity:	Two (2)
Manufacturer:	Hatco / Merco / APW Wyott
Model:	GRAHL-96
Options:	BLT INF 2 Built in infinite controls (2)
	TANDEM-SINGLE Tandem elements (2)
	STANDARD Clear anodized aluminum housing (2)
	ADJ ANGLE 7 Adjustable angle bracket (2)

ITEM #139	SOLID TOP UNIT
Quantity:	Two (2)
Manufacturer:	Duke/ Multiteria / Delfield
Model:	TST-18SS
Options:	Owner/Architect to select laminate finish (2)
	SOLID-HD-1CU Tray slide, customer side (2)
	MOD-2S-1CU Kick plate, customer side (2)
	ILD Interlocking device (2)

ITEM #140 SOLID TOP UNIT

Quantity:	Four (4)
Manufacturer:	Duke/ Multiteria / Delfield
Model:	TST-60SS
Options:	Owner/Architect to select laminate finish (4) SOLID-HD-4CU Tray slide, customer side (4) MOD-2S-4CU Kick plate, customer side (4) 329-4SS-LK (4) ILD Interlocking device (4)

ITEM #141	SOLID TOP UNIT
Quantity:	Eight (8)
Manufacturer:	Duke/ Multiteria / Delfield
Model:	TST-60SS
Options:	Owner/Architect to select laminate finish (8) SOLID-HD-4CU Tray slide, customer side (8) CUT-OP4 Rectangular cutout (8) 445-4S-HD-OP Cutting board, shelf, operator's side (8) MOD-2S-4CU Kick plate, customer side (8) ILD Interlocking device (8)

ITEM #142	INDUCTION COOKING SYSTEM
Quantity:	One (1)
Manufacturer:	Spring USA / Cooktek / Electrolux
Model:	ICB234-26
Options:	AF98710 Cell filter AF98711 Carbon filter AF9879 Baffle prefilter

ITEM #143	WORK TABLE, STAINLESS STEEL, ENCLOSED BASE
Quantity:	One (1)
Manufacturer:	Eagle Group / John Boos / Advance Tabco
Model:	CBH30120SEM
Options:	E27A Top cutout & reinforcement, for heavy drop-in equipment (Item #142 Spring USA ICB234-26)

ITEM #144	WIRE SHELVING
Quantity:	One (1)
Manufacturer:	Metro / Eagle group / Quantum
Model:	PR2460NK3 (4)
Options:	70UPK3 Posts (4) 5MP Casters (2) 5MPB Casters (2)
Sup Info:	Assemble into four tier shelving units, locate bottom shelf 12" above floor.

ITEM #X-01	EXISTING COMBI-OVEN
Quantity:	One (1)
Sup Info:	Refer to Specification Section 2.6, Standards for Existing Equipment; survey the existing item of equipment to be reused to determine the extent of reconditioning or re-

pairs necessary to place equipment in proper working order.

ITEM #X-02 EXISTING HYDROVECTION OVEN
Quantity: One (1)
Sup Info: Refer to Specification Section 2.6, Standards for Existing Equipment; survey the existing item of equipment to be reused to determine the extent of reconditioning or repairs necessary to place equipment in proper working order.

ITEM #X-03 EXISTING FOOD SLICER
Quantity: One (1)
Sup Info: Refer to Specification Section 2.6, Standards for Existing Equipment; survey the existing item of equipment to be reused to determine the extent of reconditioning or repairs necessary to place equipment in proper working order.

ITEM #S-01 RESIDENTIAL MICROWAVE
Quantity: One (1)
Sup Info: Not in foodservice equipment contract, furnished by others.

ITEM #S-02 RESIDENTIAL RANGE
Quantity: One (1)
Sup Info: Not in foodservice equipment contract, furnished by others.

ITEM #S-03 RESIDENTIAL HOOD
Quantity: One (1)
Manufacturer: Denlar
Model: D1036-D-WF-NFPA
Construction: The Fire Suppression Range Hood shall be installed in accordance with the manufacturer's instructions and applicable codes.

Unit shall be of 304 stainless steel construction with no sharp edges and brushed finish, having a fire suppression system pre-engineered into the design of the hood.

Hood shall be wall mounted so that the bottom of the mounting bracket sits 24” to 30” above the cooktop. Dimensions are 30”L x 19.38” D.

Unit shall have top ducted wall mount fan. Dimensions are 13.2” side to side, 17” top to bottom, and 4.4” front to back. CFM + 2.5% 172-522 with Electronic Control Module with fan speed controller being infinitely variable.

Unit shall include a fuel shut-off device for gas and electric appliances, activated at suppression system discharge.

Unit shall also automatically disconnect range element once certain pre-set temperature is reached.

Unit shall have multiple alarm contacts pre-installed (local, remote & trouble alarms) and an audible buzzer.

Lighting shall be by 60w shatter-proof bulb.

D1000-Tank is integral to all D1000 hood models. Self-contained fire suppression system, UL-1995 compliance, stainless steel, chemical type Amerex 660, volume 1300 mL. Tank is equipped with a pressure switch opens on discharge. Discharge hose with quick fitting attached.

The Manual Pull Station is design to discharge the D1000 Model when a user pulls the tab from the Manual Pull Station Face Plate. The D1000-MPK is provided with 25 ft stainless steel cable and with three 90 degree corner pulleys. It is required to have 7-10 inches extra of the stainless steel cable at the pull station box. The manual pull station comes equipped with 1x enclosure 4" x 1.5" octagon metal box, 1x manual pull station face plate, 1x ½" ENT conduit connector, 3x 90 degree corner pulleys, 1x 25' stainless steel cable with clevis pin.

Provide with Clockbox standard. Clockbox shall be surface mount or flush. Includes two hour timer, is password protected, and has adjustable timer.

ITEM #S-04	3-COMPARTMENT SINK, DROP-IN
Quantity:	One (1)
Manufacturer:	Eagle group / John Boos / Advance Tabco
Model:	SR12-14-9.5-3
Options:	Standard faucet

ITEM #S-05	RESIDENTIAL DISHWASHER
Quantity:	One (1)
Sup Info:	Not in foodservice equipment contract, furnished by others.

ITEM #S-07	RESIDENTIAL REFRIGERATOR
Quantity:	One (1)
Sup Info:	Not in foodservice equipment contract, furnished by others.

END OF SECTION 114000

SECTION 11 61 33
RIGGING SYSTEMS AND DRAPERIES

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. The work of this Section includes all labor, materials, equipment and services necessary to complete the Stage Rigging and Draperies installation, as shown on the drawings and specified herein, including, but not limited to, the following:
   1. Dead hung linesets
   2. Motorized performance lighting electric lineset
   3. Control system for motorized lineset
   4. Cable and cable management for motorized performance lighting lineset.
   5. Stage draperies
   6. Mule blocks, rollers and guides as necessary to provide proper alignment and maintain allowable fleet angles.
   7. Additional support structures as required to meet the intent of the Contract Documents

B. Related sections include the following:
   1. Rigging support steel, gridiron, loading and fly galleries.
   2. Support steel.
   3. Finishes
   4. Power feeds and electrical work for motorized rigging, including conduit and wire between control components, and terminations.
   5. Performance Lighting Systems
   6. Common Work Results for Electrical
   7. Interior Lighting Fixtures
   8. Commissioning of Electrical Systems
   9. Audio Video Systems
   10. Mechanical system.
   11. Fire protection system.

1.03 FULLY WORKING SYSTEMS

A. Review Drawings and Specifications that affect work in this Section.

B. Notify Architect upon indication that work in this Section cannot be completed as specified or scheduled.

C. Provide additional parts or devices required for functional requirements of control systems at no extra cost to Owner.

1.04 DEFINITIONS

A. Furnish – supply equipment to the project for use or installation by others.

B. Install – install equipment provided to the project by others.

C. Provide – supply and install equipment.

1.05 QUALITY ASSURANCE AND STANDARDS

A. References to code, standards, specifications, and recommendations of technical societies, trade organizations, and governmental agencies will refer to the latest edition of such publications adopted and published prior to bid submittal. All codes and standards will be considered a part of this specification as if they were fully included.

B. Work and materials shall comply with rules and recommendations of:
   1. Prevailing national, state and local building codes.
   2. American Iron and Steel Institute (AISI).
   3. American National Standards Institute (ANSI).
   4. American Society of Mechanical Engineers (ASME).
   5. American Society for Testing and Materials (ASTM).
   6. American Welding Society (AWS).
   7. Entertainment Services and Technology Association (ESTA).
   8. Industrial Fasteners Institute (IFI).
   9. International Organization for Standardization (ISO).
   10. National Association of Chain Manufacturers (NACM).
   11. National Fire Protection Institute (NFPA).
   12. Society of Automotive Engineers (SAE).
   13. American Gear Manufacturers Association (AGMA).
   14. National Electrical Code (NEC).
   15. National Electrical Manufacturers Association (NEMA).
C. Minimum design factor for lifted loads: 8:1. Design factor shall include the effects of static loads, dynamic impact loads and reductions for end terminations and bending ratios.
D. Minimum design factor for static loads: 6:1
E. Maximum fleet angle: 1-1/2 degrees.
F. Cable bending ratio for manually operated systems shall be at least 30 times the diameter of the cable. Motorized systems shall comply with the wire rope manufacturer's minimum recommended bending ratio.
G. Wire rope clips shall be drop-forged.
H. Fasteners typically shall have a minimum SAE J429 Grade 5 or ISO R898 Class 8.8 rating. Bolts in tension shall have nuts of equivalent rating. Fasteners shall be self-locking or secured by alternate means to prevent loosening.
I. Shackles and turnbuckle jaws shall be screw pin or bolt type, moused with plastic tie-wrap after installation. Round pins are not acceptable.
J. Turnbuckles shall be durably marked by the manufacturer with the name or trademark of the manufacturer, size or rated load, and grade for alloy eyebolts.
K. Shackle bodies shall have durable markings by the manufacturer to show the name or trademark of the manufacturer, size, and rated load.
L. Shackle pins shall have durable markings by the manufacturer to show the name or trademark of the manufacturer, and grade, material type, or load rating.
M. Helically grooved drums shall accept the wire rope in a single layer, plus 3 dead wraps. Drum construction shall be all-welded Lifting lines shall enter the drum through the tubing wall at a 45 degree angle, and shall be retained by a copper Nicopress stop sleeve.
N. Overspeed brakes shall require neither electricity nor external pressure for operation. The brake shall be factory set to automatically apply itself at 125 percent of the maximum rated winch speed Locate the brake either on the low speed output shaft of the reducer, or directly to the lifting line drum.
O. Rotary limit chain sprockets shall be pinned to prevent slipping and sized for maximum usable rotation of the switch cams.
P. Limit switch chains and encoder belts located in trafficked areas shall be fully guarded.

Q. Gearmotor service factors and load classifications shall conform to AGMA recommendations. The minimum service factor shall be 1.0 for continuous operation and the minimum gearing service factor shall be 1.0 with a minimum mechanical service factor of 1.3.

R. Fixed speed motors shall have high inertia fans or electronic “soft” stopping and starting characteristics as dictated by the load capacity and speed of the winch.

S. Shafting shall be keyed and designed to meet ANSI standards in order to properly transmit applied loads and torques with allowance for impact.

T. Chain transmission shall be made with roller chain selected to meet ANSI standards and safely transmit the full load, including impact, applied by the motor and the unbalanced set. The strength of the chain connectors shall be equal to the strength of the chain. Provide a means of lubricating and tightening the chains.

U. This specification sets forth minimum safety standards, operational criteria, and minimum standards for quality in workmanship. It is the sole responsibility of the Contractor to design, engineer, furnish and install a safe, fully functional system in compliance with the design intent of the Contract Documents.

1.06 SUBMITTALS

A. Bid Submittals
   1. Bill of materials: Identify parts by common industry standard numbers and descriptions.
   2. Cut Sheets: Manufacturer’s catalog datasheets of all products listed in bill of materials.
   3. Statement: Manufacturer agrees to warranty provisions.
   4. Projected Timetable: List time in weeks for following activities:
      a Shop drawing preparation
      b Fabrication
      Shipping to site
      System commissioning
      e As-built drawing preparation

B. Shop Drawings
   1. Format: Uniform sheet size.
   2. Binding: Bind shop drawings of more than five drawings.
   3. Shop drawings be stamped by a structural engineer licensed in the state of Delaware.
   4. Shop drawings shall include:
      a Title sheet listing all sheets in the submittal.
      b Scale plans and elevations.
      All information necessary to explain fully the design features, appearance, function, fabrication, installation, and use of system components in all phases of operation.
      Electrical specification, components, one-line riser, and interconnections.
      e Country of origin for equipment
   5. Review: Fabrication shall not commence until Theatre Consultant and Architect determine that the shop drawings are in compliance with design intent of Contract Documents.
   6. Revisions: Resubmit as required.

C. Manuals
   1. Format: Letter and/or tabloid size paper.
   2. Binding: Standard 3-ring binder.
   3. Electronic Format: PDF files on USB flash drive.
   4. Manuals shall include:
      a Contractor contact information
      b Manufacturer contact information

System description
Operation instructions, including safety measures

e Maintenance instructions, including recommended procedures and schedules for inspecting system components
f Equipment design parameters including safe working loads and duty cycles.
g Parts and subassembly lists
h Spare parts list and source information
i Catalog cuts for all purchased equipment

D. As-Built Drawings
1. Format: Letter and/or tabloid size paper.
2. Binding: Standard 3-ring binder.
3. Electronic Format: PDF files on USB flash drive.
4. Delivery: Within one month of system acceptance.
5. As-built drawings shall include:
a Final shop drawings.
b Final bill of materials.

1.07 WARRANTY

A. Manufacturer shall warrant equipment as follows:
1. According to guarantee provisions in General Conditions.
2. For three years from acceptance of systems, provide services detailed below:
a Provide for the Owner's operating staff a technical and operational assistance hotline advice service at no additional cost for the duration of the warranty period. Such advice to be available during normal working hours and on evenings and weekends.
b Provide all required maintenance or replacement within 30 days of notification by the Owner, with the following exception: All required maintenance or replacement which affects the safe operation of the installation shall be accomplished within 48 hours.

B. Warranty period: Commence upon final acceptance by Owner.

PART 2 PRODUCTS

2.01 ACCEPTABLE CONTRACTOR

A. iWeiss
815 Fairview Avenue #10
Fairview, NJ 07022
201.402.6500

B. Janson Industries
1200 Garfield Avenue SW
Canton, OH 44706
330.455.7029

C. JR Clancy
7041 Interstate Island Road
Syracuse, NY 13209
315.451.3440

D. M. Cramer & Associates
229 N. 12th St
Philadelphia, PA 19107
215.625.3603

E. Texas Scenic Co.
701 East 132nd Street
Bronx, New York, 10454
718.402.2677

2.02 FINISHES

A. Metal parts shall be free from rust, scale, dirt, and welding spatter. All weldments or other metal components shall receive a coat of corrosion resistant primer prior to finish coating and component assembly.
B. Finish coat shall be flat alkyd enamel. Color shall be black, except where noted otherwise in the Contract Documents.

2.03 BATTEN TERMINATIONS

A. Dead-hung batten hanging assemblies shall consist of a pipe clamp, proof coil chain with shackles at both ends, and a beam clamp. Chains shall be of sufficient length to hang at the trim height identified in the drawings, plus an additional 18 inches.
B. Dress the excess chain with a plastic tie wrap.
C. Motorized set lifting line terminations at the batten shall consist of a thimble, a copper Nicopress fitting, a jaw/jaw turnbuckle, and a pipe clamp. Mouse turnbuckles with plastic tie wrap. Wire mousing is not acceptable.
D. Secure the loose ends of the wire rope to the standing portion of the lines with plastic tie wrap.

2.04 LIFTING LINES

A. Lifting lines shall be of sufficient diameter and appropriate classification to suit the system operational requirements. Minimum standard for overhead lifting: 7X19 IWRC
B. Do not use any damaged or permanently deformed wire rope.
C. Use continuous lines from the same spool, free of knots, splices or intermediate fasteners unless specifically called for elsewhere in the Contract Documents.

2.05 PIPE BATTENS

A. Battens shall be 1-1/2 inch nominal diameter standard weight (Schedule 40) black iron pipe.
B. Batten splices shall be made with an 18 inch long, 1-9/16 inch diameter DOM tube with a minimum wall thickness of 3/16 inch. Weld one end of the splice tube. Fasten the other end with two 3/8 inch bolts. Threaded couplings are not acceptable.
C. Provide yellow plastic end caps on the batten ends.
D. Mark the centerline of the batten with a 1/2 inch wide, painted safety yellow line.
E. Provide set numbers at both ends of the batten on the top and bottom in 1” high black stencil numbers.
F. Provide two pipes for each electric set, configured as follows:
    1. The top pipe shall attach to the lifting line with a batten termination as described above.
    2. The bottom pipe shall attach to the top pipe via connector strip brackets furnished by the Stage Lighting Manufacturer, as shown on the drawings.

2.06 MOTORIZED LINE SETS

A. Basis of design is Prodigy P1 by Electronic Theatre Controls. Alternate systems will be evaluated on a case-by-case basis.
B. Packaged hoists shall have the following features:
C. Capacity: 2000 pounds
D. Speed: Fixed at 30 feet per minute with soft starts and stops

E. Motor brake rated for minimum 125 of the motor full load torque
F. Mechanical load brake
G. Position sensors for high, low, and preset trims
H. Rotary limit switches for overtravel limits
I. Cross-groove detection
J. Individual slack line detection
K. Individual line overload detection
L. Locking connectors for power, control, and network connections
M. Hoist assembly shall be reinforced by a horizontal compression tube that provides lateral stiffness and vertical alignment of all system components.
N. Loft blocks shall be injection molded from high-strength, glass-filled nylon with two molded-in sealed ball bearings.
O. Provide quantities per the drawings.
P. Provide pantograph cable management for electrical sets.

2.07 MULTICONDUCTOR CABLE

A. Flat power and data muticonductor cable shall be provided for load circuits and control wiring of performance lighting outlet devices mounted on the front of house lighting electric (FOH).
B. Provide cables in lengths and quantities shown on drawings.
C. Provide cables with load and data capacities as shown on TE and E series drawings.
D. Flat cables shall fold and store within integrated cable management system as shown on drawings.
E. Cable power and data terminations shall be performed by Division 26.

2.08 STAGE RIGGING CONTROLS

A. Basis of Design: QuickTouch Controller by ETC.
B. Provide one wall-mounted plug-in receptacle for stage rigging controls.
C. Provide one handheld remote controller.
D. Controllers shall include the following:
E. Status, position and load readout on screen.
F. “Go” button for movement execution.
G. No moving parts (no fan or mechanical hard drive).
H. Integral emergency-stop pushbutton.
I. One external emergency-stop (e-stop) station.
J. Key switch.
K. Automatic logging and diagnostics of entire hoist system.
L. Motor load-profiling, to stop movement at unexpected load conditions.
M. Automatic self-tests of all safety circuits.
N. Motor-usage data statistics and service-interval reminders.
O. 30 foot cable.

2.09 SIGNAGE

A. Provide one “Rigging Information” sign, as illustrated in the drawings. Wall mount the sign in a highly visible area near the stage or adjacent to the rigging control station.
B. Sign shall be dark blue lamicoid with gray engraving.

2.10 STAGE DRAPERY SCHEDULE

A. Stage drapery schedule is as follows:

Description	Quantity	Height	Width
Valance	1	4'-0"	40'-10"
House Curtain	1	17'-9"	54'-0"
Border	1	4'-0"	42'-0"
Legs	4	19'-0"	8'-0"
Upstage Traveler	1	17'-9"	44'-0"
Scrim	1	17'-9"	40'-0"
Cyclorama	1	17'-9"	40'-0"

B. Field verify all conditions and drapery dimensions after battens are installed and trimmed.

2.11 HOUSE CURTAIN AND VALANCE

A. The width of the house curtain is the finished width. The house curtain is in 2 halves, with a 2 foot overlap in the center.
B. Face fabric – 24 ounce, 100 Trevira CS Polyester, inherently flame retardant velour, KM Fabrics' "Charisma", or approved equal. Color: color to be selected by the Architect from the manufacturer's standard color range.
C. Lining - 100 percent polyester inherently flame retardant fabric, Dazian's "Janus", or approved equal. Color: beige.
D. The house curtain and valance shall be sewn with box pleats to 50 percent fullness.
E. Reinforce the top of the curtains with polyester webbing weighing a minimum of 2.8 ounces per yard, and double stitched at the top.
    1. House curtain: provide machine-set black anodized No. 3 grommets on 1 foot centers.
    2. Valance: secure valance directly to backside of proscenium opening.
F. Hem the bottom of the curtains with a 6 inch deep double turned hem with a separate canvas pocket approximately 3 inches above the bottom of the face fabric. Provide No. 8 zinc coated chain.
G. Finish the onstage edges over the entire height of the curtains so that no stitches are visible on the face.
H. Face back the center edges of the house curtains with two feet of the face fabric.
I. Face back the offstage edge of the house curtain and valance 6 inches.
J. Lining of house curtain shall have same fullness as face fabric. Attach lining to face fabric with lace loops.
K. Valance shall be unlined.
L. Velour nap shall run down.
M. Label each piece at both bottom corners with the dimensions of the piece, the manufacturer, and the date of manufacture.
N. Install the house curtain on the traveler track specified elsewhere in this section.

2.12 MASKING DRAPERIES

A. FABRICS
    1. Borders, Travelers, Masking Tabs: 24 ounce, 100 Trevira CS Polyester, inherently flame retardant velour, KM Fabrics' "Charisma", or approved equal. Color: black.
    2. Cyclorama: 100 Trevira CS IFR Polyester, 5.90 ounce per square yard, seamless fabric. Color: white.

3. Sharkstooth Scrim: 100 Trevira CS IFR Isolde, 2.21 ounce per square yard, seamless fabric. Color: black.
4. Fabrics shall be inherently flame retardant. A notarized affidavit shall accompany the draperies attesting that all are inherently flame retardant.
5. No pieced horizontal or split widths of fabric shall be incorporated in any part of any drapery.
6. Fabrics of 1 color shall be from 1 dye lot.
7. Velour nap shall run in a consistent direction. Nap shall run up for black velour masking pieces.

B. DRAPERY FABRICATION

1. The width of the travelers is the finished width. The travelers are in 2 halves, with a 2-foot overlap in the center.
2. All draperies are sewn flat and are unlined, except for the traveler curtains which shall be sewn to 50 fullness.
3. Reinforce the top of each piece with polyester webbing weighing a minimum of 2.8 ounces per yard, and double stitched at the top. Provide machine-set black anodized No. 3 grommets on 1-foot centers.
4. Provide 36-inch-long, cotton No. 4 tie lines on all pipe-mounted pieces. Tie lines shall be black, except for the one at centerline, which shall be white. If a tie line is not on center, the two symmetrical about center shall be white.
5. Provide each tracked piece with oblong spring, carabiner type snaps.
6. Hem the bottoms of the legs and travelers with a 6-inch-deep double turned hem with a separate canvas chain pocket approximately 3 inches above the bottom of the face fabric. Provide No. 8 zinc coated chain.
7. Hem the bottoms of the borders, cyclorama, and scrim with a 6-inch-deep double turned hemmed pipe pocket. Line the pocket with nylon fabric to prevent tearing. Furnish appropriate lengths of bottom pipe for each piece. Thread and cap both ends of each pipe. Provide couplers.
8. Sew back the face fabric of each piece 4 inches on both sides. The sides of each drapery piece shall hang plumb within 2 inches.
9. Label each piece at both bottom corners with the dimensions of the piece, the manufacturer, the date of manufacture, and fabric type.
10. Install the traveler curtains on traveler tracks specified below.

2.13 TRAVELER TRACK

A. Curtain track and related hardware shall be H&H Specialties Model 400 track rigged for bi-part operation. Supply track lengths with the minimum possible number of splices. Color: black.
B. Tracks shall be in two lengths with 2-feet of overlap.
C. Master and single carriers shall have nylon-tired wheels. Carriers shall have swivel eyes, trim chains, and rubber spacers. Provide carriers on 1-foot centers.
D. Provide live and dead-end pulleys, end stops, and lap clamps as required.
E. Operating lines shall be 1/2-inch stretch-resistant cord with a fiberglass center.
   1. Provide a floor mounted adjustable floor pulley.
   2. Provide clamps for attaching the tracks to the pipe battens.

PART 3 EXECUTION

3.01 COORDINATION

A. The Contractor is responsible for reviewing all drawings, specifications, and field conditions which affect the work in this Section. Notify the Architect whenever field measurements,

analysis of the drawings and specifications, or progress of other trades indicates that the work in this Section cannot be completed as specified or as scheduled.

B. Within 6 weeks of the award of contract, and prior to the preparation of shop drawings, the Stage Rigging Contractor shall submit a written review of related work as it appears on the Contract Documents. The review shall identify errors, omissions or obstructions related to the installation and operation of the equipment in this Section. The sole intent of this written review is to identify potential problems as soon as possible. It is understood that some errors, omissions or obstructions may not be evident until the Rigging Contractor prepares shop drawings.

3.02 JOB CONDITIONS

A. The Contractor shall visit the site and verify all dimensions and existing conditions. The Contractor shall also be familiar with the work of adjoining trades and coordinate with their work.

B. The Contractor is ultimately responsible for the equipment fitting the intended spaces without interference.

3.03 INSTALLATION

A. Only trained personnel shall install the equipment in this Section.

B. Provide scaffolding and platforms as required for installation.

C. Wire ropes shall be aligned and muled so as not to touch anything except their sheave grooves and terminations.

D. Install all rigging components to maximize batten travel. High trim shall be 6 inches clear of the sprinkler pipes.

E. Turnbuckles shall be moused with plastic tie wrap after adjustment. Wire mousing is not acceptable.

F. Shackle screw pins shall be moused with plastic tie wrap. Wire mousing is not acceptable.

G. Wire rope clips shall be spaced and bolts shall be tightened to the manufacturer’s recommended torque.

H. Attach Nicopress sleeves according to the manufacturer's instructions. Check the crimps with the manufacturer's go/no-go gauge. Check the adjustment of the Nicopress tool after every 50 crimps. Maximize the number of in-shop Nicopress attachments.

I. Use lock washers with all pipe clamps.

J. Battens shall be level and shall all trim to the same high and low positions within 1 inch.

K. Batten ends shall align within 1 inch.

L. Adjust set locations in the field as required and as directed by the Theatre Consultant for final adjustment, such as maintaining clearances, and minimizing spacing where desirable.

M. Secure all loose equipment, tools and debris from falling from the gridiron and galleries during all phases of the installation.

N. At the end of each day during the installation period, remove all refuse and scrap materials to collection points specified by the Owner Upon completion of the installation, leave all areas broom clean.

O. Locate all loose system parts as directed by the Owner.

3.04 PROTECTION OF EQUIPMENT

A. Protect the equipment in this Section from damage and deterioration, including rust, during all phases of the work, from the time of manufacture to installation.

B. Notify the General Contractor or Construction Manager in writing of jobsite conditions that would adversely affect the equipment after installation. Do not install the equipment if jobsite conditions beyond the control of the Rigging Contractor will result in damage or deterioration, including rust.
C. Rust resulting from flaws in manufacturing and finishing shall be covered under the Warranty.

3.05 CLEANING AND REPAIR

A. When construction is complete, restore all system components to their delivered condition. This includes dusting, cleaning, and removal of construction materials such as fireproofing.
B. Repair any work or finishes that are damaged during installation by the Contractor for the work in this Section. This includes the work in this Section and the work of others. Where the work of others is damaged, reimburse the appropriate contractor for the repair.

3.06 OPERATION OF EQUIPMENT

A. Prior to completion of the installation and turnover to the Owner, the equipment in this section shall be operated by employees of the Contractor, those authorized by the Contractor, or those under the Contractor's supervision.
B. The Contractor shall advise the General Contractor or Construction Manager in writing of any unauthorized operation of the equipment.

3.07 DRAPERY INSTALLATION

A. Hang the house curtain. Hang all other draperies as directed by the Owner for inspection and acceptance. If the Owner requests, return the draperies to their storage bags and hampers after inspection. The Owner shall assume responsibility for soiling and damage after acceptance.
B. Do not hang the draperies if environmental conditions in the building will be detrimental to the goods. Notify the Architect and the General Contractor or Construction Manager in writing of any adverse environmental conditions.

3.08 COMMISSIONING AND PUNCHLISTING

A. The Contractor shall work with the General Contractor or Construction Manager to arrange for a punchlisting period for the work in this Section. The punchlisting period shall take place at least 1 month before the first scheduled rehearsal on stage. Punchlisting shall consist of a minimum of an 8-hour day. The building schedule shall be such that no other conflicting or obstructing activity is taking place. Punchlisting shall include the operation of every component of each system specified here, including individual counterweight sets.
B. Set labeling shall be installed prior to punchlisting.
C. Prior to punchlisting, the Rigging Contractor shall commission the system and certify that the installation is complete and ready for punchlisting by the Theatre Consultant. If substantial portions of the installation are not complete, requiring the Consultant to make another punchlist trip, the Rigging Contractor shall compensate the Consultant for time spent and travel expenses. Compensation shall be at the Consultant's prevailing hourly and per diem rates.

3.09 TRAINING

A. Assist the Owner in becoming familiar with the completed installation and personally instruct representatives of the Owner in the proper operation and maintenance of all equipment provided. Training shall be a minimum of 4 hours.

3.10 OWNER'S ACCEPTANCE

A. The Owner will accept the work in this Section upon the satisfactory completion of all punch list items.

B. Prior to final acceptance, the Owner reserves the right to use any completed portion of the work in this Section at no additional cost, unless said use poses a potential hazard to personnel or risks damage to the work in this Section or the work of others.
C. The Warranty period shall commence upon final acceptance by the Owner.

END OF SECTION

SECTION 11 61 63
LOOSE PERFORMANCE LIGHTING FIXTURES

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. This section specifies loose performance lighting equipment, including the following:
   1. Performance Lighting Fixtures
   2. Fixture Accessories
   3. Followspot Fixtures
   4. Cable Assemblies
   5. Stage Hardware
   6. Tools, Storage & Supplies
   7. Hang & Focus

B. Work not included:
   1. Performance Lighting Systems

1.03 ACCEPTABLE VENDORS

A. The equipment shall be supplied by only one of the following:
   1. Barbizon
      456 W 55th Street
      New York, NY 10019
      212.586.1620
   2. Candela Controls
      15 Oweno Place
      Mahwah, NJ 07430
      201.529.2423
   3. Center Stage Lighting & Rigging
      1401 E Woodlawn Street
      Allentown, PA 18109
      610.351.2882
   4. Century Lighting
      1802 River Road
      Fair Lawn, NJ 07410
      201.791.7000
   5. M. Cramer & Associates
      229 N. 12th St
      Philadelphia, PA 19107
      215.625.3603
   6. Starlite Productions
      9 Whittendale Drive
      Moorestown, NJ 08057
      856.780.8000

1.04 SUBMITTALS

A. Submit a complete bill of materials for each product listed herein.

B. Submit product data sheets for all items for approval prior to shipment.

1.05 QUALITY ASSURANCE AND STANDARDS

A. Instruments shall be fabricated according to the standards of Underwriters' Laboratories, Inc. and shall be labeled to attest UL listing.
B. Warrant the equipment to be free to defects in materials and workmanship for a period of one year from the date of acceptance by the Owner. The warranty shall specifically include, but not be limited to, lamp sockets, lenses, shutters, and clamps. If any item proves defective within the warranty period it shall be replaced at no cost to the Owner.

PART 2 PRODUCTS

2.01 GENERAL FABRICATION REQUIREMENTS

A. Instruments shall be free of light leaks and spurious reflections adjacent to their fields.
B. Instrument fields shall be visually uniform and without hot spots, holes, stripes, or rings.
C. Pigtails shall be 36 inches long unless otherwise noted.
D. Pipe clamps shall be C-Clamp type for 1.9" (48mm) O.D. pipe unless otherwise noted. Pipe clamps shall be fitted with a spacer between clamp and yoke to permit 360° rotation.
E. Color frames, safety cables, top hats, donuts, barn doors and other similar accessories shall be finished in matte black high temperature paint.
F. Instruments that require DMX data shall be self-terminating. For instruments that are not self-terminating, DMX terminators shall be provided for 10 of the instrument quantity.

2.02 BASIS OF DESIGN FIXTURES

A. LED Spot Lights shall be supplied as one of the following:
   1. Altman Lighting PHX1.5
   2. Chauvet Professional Ovation E-910FC
   3. Electronic Theatre Controls ColorSource Spot V
   4. Vari Lite Acclaim LED Profile
B. LED Wash Light shall be supplied as one of the following:
   1. Altman Lighting AP-150
   2. Chauvet Professional Ovation F-415FC
   3. Electronic Theatre Controls ColorSource Fresnel V
   4. Vari Lite Acclaim LED Cyc
C. LED Cyc Light shall be supplied as one of the following:
   1. Altman Lighting Spectra Cyc 100
   2. Chauvet Professional Ovation Cyc 1 FC
   3. Electronic Theatre Controls ColorSource Cyc
   4. Vari Lite Acclaim Cyc

2.03 PERFORMANCE LIGHTING FIXTURES

A. Furnish the following stage lighting fixtures:

1. Description: LED Spot Light
   Accessories: Matte Black Color Frame, Pipe Clamp, Safety Cable, Lens Tube
   Connector: 15A Edison NEMA 5-15
   Quantity: 35

2. Description: LED Wash Light
   Accessories: Matte Black Color Frame, Pipe Clamp, Safety Cable
   Connector: 15A Edison NEMA 5-15
   Quantity: 15

3. Description: LED Cyc Light
   Accessories: Matte Black Color Frame, Pipe Clamp, Safety Cable
   Connector: 15A Edison NEMA 5-15
   Quantity: 20

2.04 FIXTURE ACCESSORIES

A. Furnish the following fixture accessories:
   1. Description: A-Size Template Holder for ERS
      Manufacturer: City Theatrical #2150
      Quantity: 5

2.05 CABLE ASSEMBLIES

A. All cable assemblies shall be tested after fabrication to assure wire continuity and correct polarity of connections.
B. All cable assemblies shall include shrink wrapped identification label beneath shrink wrap.
C. All cable assemblies shall include shrink wrapped length label with length text beneath shrink wrap at each end.
D. DMX512 (5-pin XLR) data cable assemblies shall consist of ruggedized cable, terminating at each end to Neutrik XX-Series XLR5 connectors with black shell. Assemblies shall be terminated in accordance with USITT (United States Institute for Theatre Technology) DMX512 specification.
   1. Furnish (60) cable assemblies of 5’-0” length.
   2. Furnish (20) cable assemblies of 10’-0” length.
   3. Furnish (5) cable assemblies of 25’-0” length.
E. Edison Extension assemblies shall consist of 12/3 SOOW cables, terminating at each end with a NEMA 5-20 receptacle.
   1. Furnish (10) cable assemblies of 5’-0” length.
   2. Furnish (10) cable assemblies of 10’-0” length.
   3. Furnish (5) cable assemblies of 25’-0” length.
F. PowerCON extension assemblies shall consist of 12/3 SOOW cables, terminating at each end with a color-coded PowerCON or other fixture-compatible receptacle. Provide LEX Products PowerFLEX or equal.
   1. Furnish (25) cable assemblies of 5’-0” length.
   2. Furnish (15) cable assemblies of 10’-0” length.

2.06 TOOLS, STORAGE, & SUPPLIES

1. Description: 3000’ 1/8” Black Cotton Unglazed Tie-Line
   Quantity: 1 Spool

PART 3 EXECUTION

3.01 SHOP PREPARATION

A. Stencil "NCCV" in one inch high characters on each stage lighting fixture lens barrel, top hat, barndoor, storage case, and power distribution box using rust red paint.
B. Install connectors for all fixtures prior to delivery.
C. Test all fixtures prior to packing for delivery.

3.02 DELIVERY

A. Bidder is responsible for coordinating delivery times per the Owner’s schedule; delivery FOB to Newark, DE.

3.03 PROTECTION OF EQUIPMENT

A. Protect the equipment in this Section from damage and deterioration during all phases of the work, from the time of manufacture to the acceptance of the completed installation.

END OF SECTION

SECTION 11 66 25 - GYMNASIUM EQUIPMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Basketball equipment, including backstop assemblies, backboards, and goals.
B. Wall-mounted protection pads.
C. Volleyball nets and posts.
D. Floor sleeves for net and goal posts
E. Wrestling mats, storage, and accessories
F. Gym Equipment Group Control System

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete for outdoor backstop foundations.
B. Section 05 12 00 - Structural Steel Framing: Structural members supporting basketball systems.
C. Section 05 50 00 - Metal Fabrications: Secondary structural members supporting gymnasium equipment.
D. Section 11 66 53 – Gymnasium Dividers: Divider specified therein shall be connected to and operated from control switch specified herein.
E. Section 09 64 29 - Wood Strip Flooring: Gymnasium flooring.
F. Section 26 05 83 - Wiring Connections

1.03 REFERENCE STANDARDS

A. ASTM D412 - 06 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
B. ASTM D1056 - 07 - Standard Specification for Flexible Cellular Materials—Sponge or Expanded Rubber.
C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
D. ASTM F-355-01 - Test Method for Shock Absorbing Properties of Playing Surface Systems and Materials.
E. ASTM F-1081-03 - Standard Specification for Competition Wrestling Mats.
F. ASTM F1292 - 09 Standard Specification for Impact Attenuation of Surfacing Materials within the Use Zone of Playground Equipment
G. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020.
H. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth 2019.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Large Components: Ensure that large components can be moved into final position without damage to other construction.
B. Electrically Operated Equipment: Coordinate location and electrical characteristics of service connection

1.05 SUBMITTALS

A. Product Data: Provide manufacturer's data showing configuration, sizes, materials, finishes, hardware, and accessories; include:
   1. Electrical characteristics and connection locations.
   2. Fire rating certifications.
   3. Manufacturer's installation instructions.
B. Shop Drawings: For custom fabricated equipment indicate, in large scale detail, construction methods; method of attachment or installation; type and gauge of metal, hardware, and fittings; plan front elevation; elevations and dimensions; minimum one cross section; utility requirements as to types, sizes, and locations.
C. Samples: Submit samples of wall pad coverings in manufacturer's available range of colors.
D. Operating and maintenance data for each operating equipment item.
E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products 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 of experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to project site in manufacturer's original packaging with factory original labels attached.
B. Store products indoors and elevated above floor; prevent warping, twisting, or sagging.
C. Store products in accordance with manufacturer's instructions; protect from extremes of weather, temperature, moisture, and other damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Gymnasium Equipment and Volleyball Equipment
   1. Draper, Inc: www.draperinc.com/sle.
   2. Performance Sports Systems: www.perfsports.com.
   3. Porter Athletic Equipment Company: www.porterathletic.com.
B. Where a basis-of-design product is listed below, approved equal products by manufacturers listed herein shall be acceptable subject to meeting the requirements of this section.
C. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 GENERAL REQUIREMENTS

A. See drawings for sizes and locations, unless noted otherwise.
B. Where mounting dimensions or sizes are not indicated, comply with applicable requirements of the following:
   1. National Federation of State High School Associations (NFHS) sports rules.
C. Provide mounting plates, brackets, and anchors of sufficient size and strength to securely attach equipment to building structure; comply with requirements of Contract Documents.
D. Hardware: Heavy duty steel hardware, as recommended by the manufacturer.
E. Electrical Wiring and Components: Comply with NFPA 70; provide UL-listed equipment.

F. Structural Steel Fabrications: Welded in accordance with AWS D1.1/D1.1M, using certified welders.

2.03 BASKETBALL EQUIPMENT

A. Indoor Backstop Assemblies
   a. Ceiling – suspended Backstop Assemblies: Capable of mounting both rectangular and fan shape backboards.
   b. Location: Ma
   c. Products
      1) Forward-folding, forward-braced: EZ Fold TF-20.
      2) Side-folding, side-braced: EZ Fold TBS-26-B.
   2. Features
      a. Capable of mounting both rectangular and fan-shaped backboards.
      b. Framing
         1) Material: Steel.
         2) Configuration: Center strut, ceiling-suspended, ceiling-braced.
         3) Fabrication: Bolt-together or welded.
         4) Color: As selected from manufacturer's standard selection.
      c. Height Adjuster
         1) Raises or lowers assembly by 2 feet to adjust goal height.
         2) Manually operated.
      d. Height Control System
         1) Motorized winch with safety strap.
         2) Control switch: Seven-gang gymnasium equipment key switch.

B. Backboards
   1. Basis of Design
      a. Manufacturer: Draper Inc.
      b. Model: As required to provide features noted below.
   2. Features
      a. Material: Tempered glass.
      b. Configuration: Rectangular, 72 inches wide by 42 inches high.
      c. Markings: Orange border and shooting target.
      d. Provide manufacturer’s backboard safety padding.

C. Goals
   1. Basis of Design
      a. Manufacturer: Draper.
      b. Model: No. 503078.
   2. Features
      a. Rim: Steel double rings.
      b. Net attachment: T-style slots.
      c. Provide nylon net and mounting hardware.
      d. Finish: Powder coat orange.

2.04 WALL PADDING

A. Wall Padding: Foam filling bonded to backing board, wrapped in covering; each panel fabricated in one piece.
   1. Surface Burning Characteristics: Flame spread index (FSI) of 25 or less, smoke developed index (SDI) of 450 or less, Class A, when tested in accordance with ASTM E84 as a complete panel.

2. Flammability: Comply with NFPA 286.
3. Covering: Vinyl-coated polyester fabric, mildew, and rot resistant; stapled to back of board.
    a. Color: As selected from manufacturer's standard range.
    b. Texture: Embossed leather-look.
    c. Fabric Weight: 14 oz/sq yd, minimum.
4. Foam, Fire-Rated: Open cell polychloroprene (Neoprene), with 5.5 pcf nominal density.
5. Foam Thickness: 2 inches.
6. Backing Board: Plywood.
7. Panel heigh: 72 inches.
8. Fastening Margins: 1 inch wide, covered by fabric covering.
9. Mounting: Permanent; using screws.
10. Manufacturers:
    a. Draper, Inc: www.draperinc.com/#sle or approved equal.
    b. Performance Sport Systems: www.perfsports.com or approved equal.
    c. Porter Athletic Equipment Company: www.porterathletic.com or approved equal.
    d. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 VOLLEYBALL EQUIPMENT

A. Standards:
    1. Powr-Trak Universal Sleeve-Type Volleyball standards, No. 01951-000 manufactured by Porter Athletic Equipment Company, Basis of Design. Alternate manufacturers:
        a. Volleyball System, No. PVS 500001 manufactured by Draper, Inc.
        b. Performance Sports Systems: Product No. 6100.
    2. Quantity: 1 set
B. Net:
    1. No. 02255-000 with Boundary Marker with Antenna No. 00546-000 manufactured by Porter Athletic Equipment Company, Basis of Design. Alternate manufacturers:
        a. Volleyball System, No. PVS 500001 manufactured by Draper, Inc.
        b. Performance Sports Systems: Product No. 6100.
    2. Quantity: 1
C. C. Protective Pads:
    1. No. 00717-003 manufactured by Porter Athletic Equipment Company, Basis of Design. Alternate manufacturers:
        a. No. 5011XX manufactured by Draper, Inc.
        b. Performance Sports Systems: Product No. 6100.
    2. Quantity: 1 set
D. Judge's Stand:
    1. Folding Stand No. 00540-100 with protective pads No. 00547-003 manufactured by Porter Athletic Equipment Company, Basis of Design. Alternate manufacturers:
        a. No. 5013XX manufactured by Draper, Inc.
        b. Performance Sports Systems: Product No. 6446/6040.
    2. Quantity: 1
E. Storage Rack and Transporter:
    1. No. 00956-100 manufactured by Porter Athletic Equipment Company, Basis of Design. Alternate manufacturers:
        a. No. 501016 manufactured by Draper, Inc.
        b. Performance Sports Systems: Product No. 6295.
    2. Quantity: 1

2.06 WRESTLING

A. Wrestling mat:
   1. Fire-retardant continuous 1.25" thick rubber nitrile foam core
   2. ASTM F-1081-03: The foam core shall have received a PASS rating of less than 100 maximum Gmax when tested in accordance with Procedure A of ASTM F-355-01.
   3. ASTM F-1292-09: Wrestling Mat shall be tested for impact protection. The wrestling mat shall have a Gmax reading of less than 200 and a HIC score (Head Injury Criterion) of less than 1,000 from a four foot (4') drop height.
   4. ASTM D-1056: Foam core shall have a compression / deflation of 5.5 - 7.5 psi.
   5. ASTM D-412: Foam core shall have a tensile (tension) strength of 75 psi or greater and an elongation property of 100 percent.
   6. Provide mats with a built-in antimicrobial product, providing protection against bacteria, mold, and mildew.
   7. Wrestling Room: Provide custom mat sizes and configurations as shown on the Drawings.
      a. Provide filler and transition pieces as necessary for wall-to-wall installation.
   8. Competition Mat: Provide regulation size competition mat for main gymnasium, in addition to Wrestling Room mats.
   9. Provide full-color, computer renderings of wrestling mats with graphics for review for layout, design, and placement.
   10. Provide two-sided wrestling and/or practice areas on both sides of the mat.
   11. Provide mat storage tubes and straps.
   12. Foam shall be coated on all sides and edges with hot-spray polyvinyl coating.
   13. Manufacturer shall be able to provide 3rd party, independent test results upon request.
   14. Manufacturer shall provide a 3-year warranty from the date of shipment.
   15. Wrestling Mat to be able to be reconditioned in the future.
   16. Quantity: 2 in wrestling room 1 in main gym.

B. Mat Hoist: Capacity: Three (3) 15’x45’ wrestling mats (1,800 lb maximum)
   1. Stationary Mat Hoist: Mini Mat Mover, No 91105-100, manufacturer by Porter Athletic Equipment Company, Basis of Design. Alternate manufacturers:
      a. Triple Mat Lifter: Product: Sectional M.L. 502019 manufacturerd by Draper, Inc.
      b. Performance Sport Systems: Product No. 4091
   2. Electrical: 2HP, 208V, 3 PH, 60HZ
   3. Operation: Keyswitch.
   4. Quantity: 2

C. Mat Edge Transition.
   1. Material: Durable PVC.
   2. Dimensions 6 ¼” wide x 1 ½” high x 6’ long. 2” extended lip to cover the mat edge.
   3. Tape to secure the transition lip to the mat surface.

2.07 MISCELLANEOUS

A. Gym Equipment Group Control System:
   1. Product Smart Gym Control Systems manufactured by Draper, Inc.
   2. Processor assembly in surface mounted 8 x15 x2 inch enclosure, quantity as required for controlling all gym equipment.
   3. Color Touchscreens in recessed 3.5 x 5.5 x 2.5 inch box, locations and quantity as shown on drawings.
   4. Gym Up/Down control:
      a. Basketball Goals, Main Courts
      b. Basketball Goals, Side Courts
      c. Basketball Goal, side Courts Height Adjustment

5. On/Off Control:
    a. Scoreboards
    b. Shock Clocks

2.08 SCOREBOARDS

A. Wall mounted Scoreboards: Interior, electronic basketball scoreboard with two integral horns and LED displays for time, scores, period, number for player fouling with personal fouls, team fouls, timeout left, bonus and double indicators and next possession arrows. Team Name and intelligent Captions™ 100% electronics.
    1. Product: Model BB-2155 by Daktronics.
        a. Dimension: 6’-0” (1.83m) high, 10’-0” (3.05 m) wide, 0’-6” (152 mm) deep
        b. Scoreboard Back, face, and perimeter:0.063” (1.60 mm) thick aluminum.
        c. Decorative accents: Indoor Non-Backlit Ad Panel: 2’ x 10’ horizontal.
    2. Locker Room Clocks: Daktronics TI -2031 wall mounted locker room clocks.
        a. Displays time in synchronization with scoreboard clocks.
        b. Provide one (1) per locker room.
    3. Shot Clock: Daktronics Model BB-2115.
        a. Displays game time and shot times up to a value of 99 seconds.
        b. Dimensions: 2’-4” (711 mm) high, 2’-5” (737 mm) wide, 0’-6” (152mm) deep
        c. Quantity: 2. Mount to main court backstops with brackets by basketball backstop manufacturer.
    4. Control Console: Wireless, microprocessor based, operator’s control center with receiver unit mounted as scoreboard and designed to operate different models of scoreboard by interchange of keyboard overlay.
        a. Product: Model #AS-5000 as manufactured by Daktronics.

2.09 FLOOR MOUNTED EQUIPMENT

A. Floor Sleeves for Posts: Metal sleeve, with latch cover, cast into concrete subfloor to hold poles for nets and goals; installed flush with finish floor surface.
    1. Latch Cover: Brass, round, tamper resistant lock with key.
    2. Sleeve: Aluminum.
    3. Depth of Sleeve: 9 inches from floor surface to bottom, including latch cover.

PART 3 EXECUTION

3.01 EXAMINATION

A. Take field measurements to ensure proper fitting of work. If taking field measurements before fabrication will delay work, allow for adjustments within recommended tolerances.
B. Inspect areas and conditions before installation. Notify Architect in writing of unsatisfactory or detrimental conditions.
C. Do not proceed with this work until conditions have been corrected; commencing installation constitutes acceptance of work site conditions.

3.02 INSTALLATION

A. General
    1. Install in accordance with Contract Documents and manufacturer's instructions.
    2. Install equipment rigid, straight, plumb, and level.
    3. Secure equipment with manufacturer's recommended anchoring devices.
    4. Install wall padding securely, with edges tight to wall and without wrinkles in fabric covering.

5. Separate dissimilar metals to prevent electrolytic corrosion.

B. Control switch location
   1. Requirements
      a. Switch shall be located where switch operator can see and monitor raising and lowering of backstop assemblies and of gymnasium divider curtain while telescoping bleachers are fully extended.
      b. Switch location and mounting height shall comply with accessibility requirements for maneuvering clearances, forward-reach ranges, and side-reach ranges.
   2. Approval: Obtain Owner’s approval of switch location prior to installation.

3.03 ADJUSTING

A. Verify proper placement of equipment.

B. Verify proper placement of equipment anchors and sleeves and use actual movable equipment to be anchored if available.

C. Adjust operating equipment for proper operation; remove and replace equipment causing noise or vibration; lubricate equipment as recommended by manufacturer.

3.04 CLEANING

A. Remove masking or protective covering from finished surfaces.

B. Clean equipment in accordance with manufacturer's recommendations.

3.05 PROTECTION

A. Protect installed products until Date of Substantial Completion.

B. Replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 11 66 53 - GYMNASIUM DIVIDERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Electrically operated fabric gymnasium dividers in Auditorium and Gymnasium 150.

1.02 RELATED REQUIREMENTS

A. See structural drawings and specs for divider support.

B. See electrical drawings and specs for electrical supply, conduit, and wiring for motorized winch and controls.

C. Control switch: Motorized winch to be operated from key switch provided under Section 11 66 25, Gymnasium Equipment.

1.03 REFERENCES

A. American Welding Society (AWS)
   1. AWS Certified Welder Program.

B. Underwriters Laboratories (UL)
   1. UL 2818 GreenGuard Standard for Building Materials, Finishes and Furnishings.
   2. UL 2821 GreenGuard Test Method for Building Materials, Finishes and Furnishings.

C. State of California
   1. California Code of Regulations, Title 19
      a. Section 1237, Fire Resistance (Small Scale Test)
      b. Section 1237.1, Test Method (Small Scale Test)
      c. Section 1237.2, Fire Resistance (Large Scale)
      d. Section 1237.3, Test Method (Large Scale Test)
   2. American Society of Testing and Materials (ASTM)
      a. ASTM D5116, Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products.
   3. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
      a. ASHRAE 62.1, Ventilation for Acceptable Indoor Air Quality.

1.04 SUBMITTALS

A. Product Data: Provide manufacturer's data showing configuration, sizes, materials, finishes, hardware, and accessories. Include:
   1. Loads to be transmitted to building structural members and requirements for supplementary bracing and structural support members.
   2. Manufacturer’s calculations and reports of tests performed by an independent testing laboratory accredited by the American Association of Laboratory Accreditation (A2LA) that demonstrate compliance with minimum safety factors included in product specifications.
   3. Certificates for Divider Curtain Vinyl and Mesh demonstrating compliance with the requirements of GreenGuard Gold.

B. Shop Drawings: Showing layout, elevations, dimensions, fabrication details, methods of attachment, and electrical wiring diagrams.

C. Color submittals

1. Physical color cards showing manufacturer's standard range for Architect's preliminary selection of up to four colors.
2. Samples for approval: Physical samples of curtain fabric, two (2) in each preliminary color selected by Architect.

D. Operating and maintenance data for each operating equipment item.
E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
F. Manufacturer's installation instructions.

1.05 WARRANTY

A. Five-year limited warranty on motorized winch.

1.06 QUALITY ASSURANCE

A. Source limitation: All components including curtain, suspension system, motorized winches, and controls for divider shall be products of a single manufacturer.
B. Welder qualifications: All welding to be performed by personnel having passed Welder Qualification testing in accordance with American Welding Society (AWS) code D1.1 or higher. Manufacturer to provide certification and test results upon request.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver divider until building is enclosed and other construction within gymnasium is substantially complete.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Draper, Inc: www.draperinc.com/sle.
B. Porter Athletic Equipment Company: www.porterathletic.com.
C. Performance Sports Systems: www.perfsports.com.
D. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 GYMNASIUM DIVIDER

A. Basis of Design: Top-Roll Gym Divider Curtain by Draper, Inc.
B. Type: Electrically operated, top-roll gymnasium divider including motor, controls, clamps for attachment to building structure, threaded rod supports, and other components required for complete functional installation.
C. Operation: Curtain moves by rolling directly onto drive tube without the use of belts or cables.
D. Configuration: Rectangular shape with straight bottom, extending across room in widths and locations indicated on Drawings.
   1. Maximum dimension of stored divider: 14 inches from bottom of structural support to bottom of rolled curtain.
   2. Required clearances between vertical curtain edges and adjacent fixed objects as indicated on Drawings.
   3. Passage space between curtain ends and walls as indicated on Drawings.
E. Attachment: Attach to structural support with beam clamps, hanger brackets, and 1/2 inch diameter threaded rods. Attachment clamps designed to be capable of supporting a minimum of 5,000 lbs. each and provided in sufficient number to provide a combined minimum 45:1 attachment point safety factor.

F. Drive pipe: 5 inches diameter steel pipe. Drive pipe shall roll in precision laser cut and formed support assemblies. Assemblies spaced at a maximum of 10 feet on center.
G. Divider bottom: 1-5/8 inches diameter steel pipe batten in 6 inches wide curtain pocket.

2.03 CURTAIN

A. Fabric
   1. Opaque solid vinyl coated polyester.
   2. Weight: 18 ounces per SY.
   3. Resistant to rot, mildew, and ultraviolet light.
   4. Flammability: Fabric shall comply with the fire resistance requirements set forth in the sections of the California Code of Regulations, Title 19 specified below when tested per the corresponding sections specified.
      a. Section 1237, Fire Resistance (Small Scale Test), when tested per Section 1237.1, Test Method (Small Scale Test).
      b. Section 1237.2, Fire Resistance (Large Scale), when tested per Section 1237.3, Test Method (Large Scale Test)
   5. Color
      a. Selected by Architect from manufacturer's standard range.
      b. Provide separate colors in Auditorium and Gymnasium if so selected.
   6. VOC Emission
      a. Divider Curtain Vinyl to be low emitting and certified to meet the requirements of the GREENGUARD Gold certification program.
      b. Manufacturer to provide certificate and/or test results upon request.
B. Construction
   1. Full height curtain.
      a. Seams: Horizontal, electronically welded with 1 inch full contact weld.
      b. Outer edge hems: Turned with double welds.
      c. Top edge: Solid fabric, cut square for attachment to roller tube and of sufficient length to allow at least two complete wraps on roller tube at all times.
      d. Bottom edge: Padded pocket housing bottom pipe batten.

2.04 CURTAIN SAFETY DEVICE

A. Safety locking device directly speed-sensitive to lock divider curtain automatically in position at any time during storage or operation.
B. In the event of an over-speed situation (greater than 1.5 feet per second) caused by malfunction of the hoisting apparatus, whether sudden or gradual, device will immediately activate.

2.05 MOTORIZED WINCH

A. Motor
   1. Power: 3/4 HP.
   2. Torque: Minimum 1,500 inch-pounds while running at 13.5 RPM.
   3. Operation: Instantly reversing.
B. Gear Case
   1. High-strength metal alloy.
   2. Oil-filled.
C. Gears: Hardened steel.

PART 3 EXECUTION

3.01 PREPARATION

A. Provide protection and exercise care not to damage gymnasium flooring installed before beginning of gymnasium divider installation.
B. Coordinate support of gymnasium divider with roof structure to ensure proper distribution of loads and adequacy of attachment points. Ensure that building structure has been designed for loads of specific gymnasium divider to be provided. Provide additional structural framing members as required.
C. Coordinate configuration, size, and installation of gymnasium divider with height, slope, and type of building structure and with lighting fixtures, mechanical equipment, ductwork, fire-suppression system, bleachers, athletic equipment, and other potential obstructions.
D. Field-verify dimensions prior to fabrication.
E. Coordinate electrical requirements for motorized operating mechanism to ensure proper power source, conduit, wiring, and boxes for keyed switches. Verify type and location of power supply prior to installation,

3.02 INSTALLATION

A. Install in accordance with manufacturer's written instructions and shop drawings.
B. Install even and level with curtain hanging 2 inches above floor in down position.
C. Connect motorized winch to control switch provided under Section 11 66 25, Gymnasium Equipment.
D. Adjust motorized winch limit switches to ensure accurate position in both stored and lowered positions.

3.03 TESTING AND DEMONSTRATION

A. Operate divider curtains to ensure proper lifting and lowering. Adjust as required to ensure smooth operation and accurate positioning.
B. Demonstrate to Owner's designated representative complete operation and required maintenance.

END OF SECTION

SECTION 12 24 13
WINDOW TREATMENT – ROLLER SHADES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Manual roller shades with fascia and light filtering fabric for exterior clear glazed windows and interior vision panels and sidelights as scheduled.

1.02 REFERENCES

A. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

B. NFPA 701 - Fire Tests for Flame-Resistant Textiles and Films.

1.03 SUBMITTALS

A. Product data: Provide manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
   3. Storage and handling requirements and recommendations.
   4. Mounting details and installation methods.

B. Shop Drawings: Show location and extent of roller shades. Include elevations, sections, details, and dimensions not shown in Product Data. Show installation details, mountings, attachments to other Work, operational clearances, and relationship to adjoining work.

C. Samples for Initial Selection: For each colored component of each type of roller shade indicated.

D. Window Treatment Schedule: Submit Window Treatment Schedule using same room designations indicated on Drawings.

E. Maintenance Data: Include in maintenance manuals:
   1. Methods for maintaining roller shades/blinds and finishes.
   2. Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.
   3. Operating hardware.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has successfully completed and serviced installations similar in scope to that indicated for this Project.

B. Source Limitations: Obtain each type of window treatment through one source from a single manufacturer.

C. Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.

D. Fire-Test-Response Characteristics: Provide window treatment materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
   1. Flame-Resistance Ratings: Passes NFPA 701.

E. Mock-Up: Provide a mock-up (manual shades only) of one roller shade assembly for evaluation of mounting, appearance and accessories.
   1. Locate mock-up in window designated by Architect.

2. Do not proceed with remaining work until, mock-up is accepted by Architect.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver in factory packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in window treatment schedule.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Do not install window treatment until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.07 WARRANTY

A. Products: Minimum 10 years from substantial completion or manufacturer’s standard warranty.

B. Installation: One year from substantial completion.

PART 2 - PRODUCTS

2.01 MANUAL ROLLER SHADES

A. Basis of specification

1. WT-1/WT-2:
   a. Draper Shade & Screen Co., Inc.; FlexShade XD ceiling mounted, single shadecloth, with Phifer 4400 3% open or similar.
   b. Basis of Design: MechoShade: MechoShade/5 with EuroTwill 6000, 3% open or similar.
2. Color: One standard color as selected by Architect from manufacturer’s standard
3. Rollers: Electrogalvanized or epoxy primed steel or extruded-aluminum tube of diameter and wall thickness required to support and fit internal components of operating system and the weight and width of shade band material without sagging; designed to be easily removable from support brackets; with manufacturer's standard method for attaching shade material. Provide capacity for one roller shade band per roller.
4. Direction of Roll: Regular, from back of roller.
5. Mounting Brackets: Steel, 1/8 inch (3mm) thick. Sizes to be compatible with window shade size and clutch capacity. Bracket style to be compatible with mounting requirements and site conditions.
   a. Mounting (WT-1): ceiling mounted.
   b. Mounting (WT-2): wall mounted.
6. Bottom Bar: Steel or extruded aluminum. Provide concealed, by pocket of shade material, internal-type bottom bar with concealed weight bar as required for smooth, properly balanced shade operation.
7. Fascia:
   a. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners.
   b. Fascia shall be able to be installed across two or more shade bands in one piece.
   c. Fascia shall fully conceal brackets, shade roller and fabric on the tube.

d. Provide bracket / fascia end caps where mounting conditions expose outside of roller shade brackets.

8. Shade Operation: Manual - with continuous loop bead chain, clutch, and cord tensioner and bracket lift operator.
9. Position of Clutch Operator: Right side of roller, as determined by hand of user facing shade from inside, unless otherwise indicated or dictated by field conditions.
10. Clutch: Capacity to lift size and weight of shade; sized to fit roller or provide adaptor.
11. Lift Assist Mechanism: Manufacturer's standard spring assist for balancing roller shade weight and lifting heavy roller shades.
12. Bead Chain: Nickel-plated metal or Stainless steel.
13. Cord Tensioner Mounting: As required per installation.
14. Operating Function: Stop and hold shade at any position in ascending or descending travel.

B. ROLLER SHADE FABRICATION

1. Product Description: Roller shade consisting of a roller, a means of supporting the roller, a flexible sheet or band of material carried by the roller, a means of attaching the material to the roller, a bottom bar, and an operating mechanism that lifts and lowers the shade.
2. Concealed Components: Non-corrodible or corrosion-resistant-coated materials.
   a. Lifting Mechanism: With permanently lubricated moving parts.
3. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F:
   a. Shade Units installed outside (typical) : If inside mount is required, edge of shade not exceed 1/4 inch from face of jamb.
   b. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.
   c. Fabricate shadecloth to hang flat without buckling or distortion.
4. Installation Brackets: Shall allow for easy removal and reinstallation of shade, operating hardware and for hardware position and shade mounting method indicated.
5. Installation Fasteners: Not fewer than two fasteners per bracket, fabricated from metal non-corrosive to shade hardware and adjoining construction; type designed for securing to supporting substrate; and supporting shades and accessories under conditions of normal use.
6. Colors of Metal and Plastic Components Exposed to View: As selected by Architect from manufacturer's full range, unless otherwise indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 ROLLER SHADE INSTALLATION AND ADJUSTING

A. Install roller shades level, plumb, square, and true according to manufacturer's written instructions, and located so shade band is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.
B. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.03 CLEANING AND PROTECTION

A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
B. Remove surplus materials, rubbish, and debris resulting from installation upon completion of work, and leave areas of installation in neat, clean condition.
C. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, which ensure that roller shades are without damage or deterioration at time of Substantial Completion.

3.04 SCHEDULE

A. Refer to Drawings for locations.

END OF SECTION 12 24 13

SECTION 12 34 00
MANUFACTURED PLASTIC LAMINATE CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured standard and custom casework, with cabinet hardware.
B. Mobile cabinets.

1.02 RELATED REQUIREMENTS

A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: VOC limitations for adhesives and sealants.
B. Section 06 10 00 - Rough Carpentry: Blocking and nailers for anchoring casework.
C. Section 06 20 00: Millwork, trim and custom cabinetry.
D. Section 07 92 00 - Joint Sealants: Sealing joints between casework and countertops and adjacent walls, floors, and ceilings.
E. Section 09 21 16 - Gypsum Board Assemblies: Reinforcements in metal-framed partitions for anchoring casework.
F. Section 09 65 00 - Resilient Flooring: Resilient wall base.
G. Section 12 36 00 - Countertops, Backsplashes and Window Stools: Additional requirements for countertops.
H. Section 22 40 00 - Plumbing Fixtures: Sinks and fittings installed in casework.
I. Section 26 27 26 - Wiring Devices: Switches, receptacles installed in casework.

1.03 DEFINITIONS

A. Exposed: Portions of casework visible when drawers and cabinet doors are closed, including end panels, bottoms of cases more than 42 inches (1.066 m) above finished floor, tops of cases less than 72 inches (1.82 m) above finished floor and all members visible in open cases or behind glass doors.
B. Semi-Exposed: Portions of casework and surfaces behind solid doors, tops of cases more than 72 inches (1.828 m) above finished floor and bottoms of cabinets more than 30 inches (0.762 m) but less than 42 inches (1.066 m) above finished floor.
C. Concealed: Sleepers, web frames, dust panels and other surfaces not generally visible after installation and cabinets less than 30 inches (762 mm) above finished floor.
D. Open Interiors: Any open storage unit without solid door or drawer fronts, units with full glass insert doors and/or acrylic doors, and units with sliding solid doors.
E. Closed Interiors: Any closed storage unit behind solid door or drawer fronts.
F. Exposed Ends: Any storage unit exterior side surface that is visible after installation.
G. ANSI A135.4 - Basic Hardboard 2012 (Reaffirmed 2020).
H. ANSI A208.1 - American National Standard for Particleboard 2022.
I. ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications 2022.
J. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015 (Reaffirmed 2020).
K. ASTM C1036 - Standard Specification for Flat Glass 2021.
L. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
M. AWI (QCP) - Quality Certification Program Current Edition.

N. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
O. BHMA A156.9 - Cabinet Hardware 2020.
P. NEMA LD 3 - High-Pressure Decorative Laminates 2005.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting at least one week prior to the start of the work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
B. Product Data: Component dimensions, configurations, construction details, joint details, attachments.
C. Shop Drawings: Indicate casework types, sizes, and locations, using large scale plans, elevations, and cross sections. Include rough-in and anchors and reinforcements, placement dimensions and tolerances, clearances required, and keying information.
    1. Include section drawings of typical and special casework, work surfaces and accessories.
    2. Indicate locations of plumbing and electrical service field connection by others.
D. Samples for Finish Selection: Fully finished, for color selection. Minimum sample size: 2 inches by 3 inches (51 mm by 75 mm).
    1. Plastic laminate samples, for color, texture, and finish selection.
    2. PVC edgings.
E. Casework Samples: Representative of types in the project.
    1. Base Cabinet: Cabinet with drawer and door and specified hardware.
    2. Wall Cabinet: Cabinet with shelves and supports, door and specified hardware.
F. Manufacturer's Qualification Statement.
G. Installer's Qualification Statement.
H. Maintenance Data: Manufacturer's recommendations for care and cleaning.
I. Finish touch-up kit for each type and color of materials provided.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.
B. Fabricator Qualifications (where fabricator is not an approved manufacturer of modular laminate clad casework):
    1. Company specializing in fabricating the products specified in this section with minimum ten years of documented experience.
    2. Company with at least one project in the past 5 years with value of woodwork within 50 percent of cost of woodwork for this Project.
    3. Accredited, licensed participant in the specified certification program, prior to the commencement of fabrication and throughout the duration of the project.
    4. Quality Certification: Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section.
        a. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) requirements for grade or grades specified.
        b. Contractor, upon award of work, shall register the work under this section with the AWI Quality Certification Program (855-345-0991)
        c. Provide designated labels on shop drawings as required by certification program.
        d. Provide designated labels on installed products as required by certification program.

e. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.
f. Replace, repair, or rework all work for which certification is refused.

C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than five years of documented experience and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect items provided by this section, including finished surfaces and hardware items during handling and installation. For metal surfaces, use polyethylene film or other protective material standard with the manufacturer.

B. Acceptance at Site:

1. Do not deliver or install casework until the conditions specified under Part 3, Examination Article of this section have been met. Products delivered to sites that are not enclosed and/or improperly conditioned will not be accepted if warping or damage due to unsatisfactory conditions occurs.

C. Storage:

1. Store casework in the area of installation. If necessary, prior to installation, temporarily store in another area, meeting the environmental requirements specified under Part 3, "Site Verification of Conditions" Article of this section.

1.08 MOCK-UPS

A. Provide full size base cabinet complete with drawers, door, adjustable shelf and countertop.
B. See Section 01 40 00 - Quality Requirements for additional requirements.
C. Locate where directed.
D. Mock-up may remain as part of the work.

1.09 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
B. Correct defective Work within a five year period after Date of Substantial Completion, at no additional cost to Owner. Defects include, but are not limited to:

1. Ruptured, cracked, or stained finish coating.
2. Discoloration or lack of finish integrity.
3. Cracking or peeling of finish.
4. Failure of hardware.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Plastic Laminate Casework:

1. Basis of design: TMI Systems Corporation: www.tmisystems.com/#sle.
2. Case Systems: www.casesystems.com/#sle.
3. Stevens Industries: www.stevensadvantage.com.
4. Substitutions: See Section 01 60 00 - Product Requirements. Approved fabricators and manufacturers shall comply with the minimum levels of material and detailing indicated on the drawings or as specified.
   a. Fabricators meeting Quality Assurance requirements in PART 1 shall submit evidence of compliance with requirements for approval during bidding.

2.02 CASEWORK, GENERAL

A. Quality Standard: AWI/AWMAC/WI (AWS), unless noted otherwise.
B. Plastic Laminate Faced Cabinets: Custom Grade.

2.03 FABRICATION

A. Fabricate casework, countertops and related products to dimensions, profiles, and details shown.
B. Assembly: Shop assemble casework items for delivery to site in units easily handled and to permit passage through building openings.
C. Construction: As required for selected grade.
D. Structural Performance: Safely support the following minimum loads:
   1. Base Units: 500 pounds per linear foot (744 kgs/linear m) across the cabinet ends.
   2. Suspended Units: 300 pounds (136 kg) static load.
   3. Drawers: 125 pounds (57 kg), minimum.
   4. Hanging Wall Cases: 300 pounds (135 kg).
   5. Shelves: 100 pounds (45 kg), minimum.
E. Glazing for Doors: Clear tempered glass.
   1. Glazing: With gaskets and removable stops; minimize rattling and vibration.
F. Fittings and Fixture Locations: Cut and drill components for fittings and fixtures.
G. Access Panels: Where indicated, for maintenance of utility service and mechanical and electrical components.
H. Removable back panels on indicated base cabinets. Provide partial height back panels at sink cabinets.
I. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
J. Scribes and Fillers: Panels of matching construction and finish, for locations where cabinets do not fit tight to adjacent construction.
K. Mobile Cabinets: Same construction as fixed base cabinets, with modifications.
   1. Toe kick space eliminated.
   2. Cabinet underside reinforced as is standard with the manufacturer to provide caster mounting points.
   3. Four casters, each with a load rating of 165 pounds (74.8 kg).
L. Apron Frames: Construction similar to other cabinets, with modifications.
   1. Frames fabricated from panels standard with the manufacturer. Include front and back panels, with drawer suspension framing mechanically fastened to support channels spanning between them.

2.04 PLASTIC-LAMINATE-CLAD CASEWORK

A. Plastic-Laminate-Clad Casework: Solid wood and wood panel construction; each unit self-contained and not dependent on adjacent units or building structure for rigidity; in sizes necessary to avoid field cutting except for scribes and filler panels. Include adjustable levelers for base and tall cabinets.
   1. All casework panel components sized/cured to be precisely finished in size and squareness to within 0.010 inches, ensuring strict dimensional quality and structural integrity in the final fabricated product.
   2. Style: Flush overlay. Ease doors and drawer fronts slightly at edges.
   3. Cabinet Nominal Dimensions: Unless otherwise indicated, provide cabinets of widths and heights indicated on drawings, and with following front-to-back dimensions:
      a. Base Cabinets: 22 inches (559 mm).
      b. Tall Cabinets: 22 inches (559 mm).
      c. Wall Cabinets: 16 inches (406 mm).
   4. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline.

a. Finish: Matte or suede, gloss rating of 5 to 20.

B. Cabinet Body Construction:
1. Tops and bottoms shall be glued and doweled to cabinet sides and internal cabinet components such as fixed horizontals, rails and verticals.
   a. Tops, bottoms and sides of all cabinets are particleboard core.
   b. Tops, bottoms and sides of sink base units are moisture resistant particleboard core.
2. Cabinet backs: 1/4 inch thick medium density fiberboard panel fully captured by the cabinet top, bottom and side panels. Finish to match cabinet interior. 3/4 inch x 4 inch particleboard rails will be placed behind the back panel at the top and bottom, and doweled to the sides utilizing 10mm hardwood fluted dowels. A third intermediate rail will be included on all cabinets taller than 56 inches. Utilize hot melt glue to further secure back and increase overall strength.
3. Fixed base and tall cabinets shall have factory mounted bases of 3/4 inch thick exterior grade plywood. Base is nominal 4 inch high unless otherwise indicated on the drawings.
4. Base units, except sink base units: Full sub-top. Sink base units are provided with open top and a stretcher at the front, attached to the sides. Back to be split removable access panel.
5. Side panels and vertical dividers shall receive adjustable shelf hardware. Mount door hinges, drawer slides and pull-out shelves in the line boring for consistent alignment.
6. Exposed and semi exposed edges.
   a. Edging: 1mm PVC.
7. Adjustable shelf core: 3/4 inch thick particleboard up to 36 inches wide, 1 inch thick particleboard over 36 inches wide.
   a. Front edge: 1mm PVC.
8. Interior finish, units with open Interiors:
   a. Top, bottom, back, sides, horizontal and vertical members, and adjustable shelving faces with VGS high-pressure decorative laminate.
9. Interior finish, units with closed Interiors:
   a. Top, bottom, back, sides, horizontal and vertical members, and adjustable shelving faces with thermally fused melamine laminate.
10. Exposed ends:
    a. Faced with VGS high-pressure decorative laminate.
11. Wall unit bottom:
    a. Faced with VGS high-pressure decorative laminate.
12. Balanced construction of all laminated panels is mandatory. Unfinished core stock surfaces, even on concealed surfaces (excluding edges), are not permitted.

C. Drawers:
1. Sides, back and sub front: Minimum 1/2 inch thick particleboard, laminated with thermally fused melamine doweled and glued into sides. Top edge banded with 3mm PVC.
2. Drawer bottom: Minimum 1/2 inch thick particleboard laminated with thermally fused melamine, screwed directly to the bottom edges of drawer box.
3. Paper storage drawers: Minimum 3/4 inch thick particleboard sides, back, and sub front laminated with thermally fused melamine. Minimum 1/2 inch thick particleboard drawer bottoms screwed directly to the bottom edges of the drawer box. Provide PVC angle retaining bar at the rear of the drawer.

D. Door/Drawer Fronts:
1. Core: 3/4 inch thick particleboard except at sink units which is 3/4 inch thick moisture resistant particleboard.
2. Provide double doors in opening in excess of 24 inches wide.

3. Faces:
   a. Exterior: VGS High-pressure decorative laminate.
   b. Interior: High-pressure cabinet liner CLS.
4. Door/drawer edges: 3mm PVC, external edges and outside corners machine profiled to 1/8 inch radius.

E. Miscellaneous Shelving:
1. Core material: 3/4 inch or 1 inch thick particleboard.
2. Exterior: VGS High-pressure decorative laminate.
3. Edges: 3mm PVC, external edges and outside corners machine profiled to 1/8 inch radius.

2.05 COUNTERTOPS

A. Countertops: See Section 12 36 00.

2.06 CABINET HARDWARE

A. Comply with BHMA A156.9 requirements.

B. Locks: Provide locks on casework drawers and doors unless otherwise noted. Lock with 5 pin cylinder and 2 keys per lock.
1. Hinged Doors: Cam type lock, satin chromium plated over nickel on base material.
2. Elbow catch or chain bolt used to secure inactive door on all locked cabinets.
3. Tall Hinged Doors: Three-point latching system.
4. Keying: Key locks alike within a space; key each room separately.
5. Master Key System: All locks operable by master key.

C. Adjustable Shelf Supports:
1. Injection molded transparent polycarbonate shelf supports friction fit into cabinet end panels and vertical dividers, adjustable. Shelf support have minimum 2 integral support pins to interface pre-drilled holes, and to prevent accidental rotation of support. The support shall adapt to 3/4 inch or 1 inch thick shelving and provides non-tip feature for shelving. Supports may be field fixed if desired. Structural load to 1200 pounds (300 pounds per support) without failure.

D. Swinging Doors: Hinges, pulls, and catches.
1. Hinges: Semi-concealed, number as required by referenced standards for width, height, and weight of door.
   a. Semi-Concealed Hinges: Installed as required by hinge design, satin stainless steel.
      1) Butt hinges installed on cabinet face, and on door face; five-knuckle, projecting barrel, minimum 2-1/2 inches long (five-knuckle, projecting barrel, minimum 64 mm long).
2. Pulls: Satin stainless steel wire pulls, 4 inches (102 mm) wide.
3. Catches: Mechanical catch.

E. Drawers: Pulls and slides.
1. Pulls: Stainless steel wire pulls, 4 inches (102 mm) wide.
2. Slides: Full extension: 150-pound load rated epoxy coated steel, bottom corner mounted with smooth and quiet nylon rollers. Positive stop both directions.

2.07 MATERIALS

A. Adhesives Used for Assembly: Comply with VOC requirements for adhesives and sealants; see Section 01 61 16.

B. Wood-Based Materials:
1. Solid Wood: Air-dried to 4.5 percent moisture content, then tempered to 6 percent moisture content before use.
2. Composite Wood Panels: Containing no urea-formaldehyde resin binders.

C. Certified Particleboard: SCS Certified 100% pre-consumer recycled wood fiber particleboard with no Urea Formaldehyde added during the manufacturing process.

1. Up to 7/8 inch thick: Industrial Grade average 47-pound density meeting ANSI A208.1 , M-3 requirements.
2. 1 inch think: Industrial Grade average 45-pound density meeting ANSI A208.1, M-2 requirements.
3. MR Moisture Resistant Particleboard: Average 47-pound density particleboard, ANSI A208.1 , M-3.

D. Toe Base Plywood: 3/4 inch thickness, CC/CD/CDC grades, of western softwood veneers, with NAUF exterior fully water resistant phenolic glues.
E. Medium Density Fiberboard 1/4 inch thick: Average 54-pound density grade, ANSI A208.2 .
F. Hardboard: ANSI A135.4, Class 1, tempered.
G. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications. complying with Grade requirements, and standard with the manufacturer.
   1. High-pressure decorative laminate VGS (.028), NEMA LD 3.
   2. High-pressure decorative laminate HGS (.048), NEMA LD 3.
   3. High-pressure decorative laminate HGP (.039), NEMA LD 3 .
   4. High-pressure cabinet liner CLS (.020), NEMA NEMA LD 3 .
   5. High-pressure backer BKH (.048), (.039), (.028), NEMA LD 3.
H. Laminate Color Selection: Maximum 1 color per unit face and 12 colors per project. Refer to Finish Schedule.
I. Thermally Fused Laminate (TFL): Melamine resin, NEMA LD 3, Type VGL laminate panels.
J. Glass: Fully tempered float; ASTM C1036, Type 1, Quality Q3; ASTM C1048, tempered using horizontal tempering and complying with ANSI Z97.1; 3/16 inch (4.5 mm) thick minimum; exposed edges ground, and cut or drilled to receive hardware; clear.

2.08 ACCESSORIES

A. Plastic Edge Banding: Extruded PVC, convex shaped; smooth finish; self locking serrated tongue; of width to match component thickness.
   1. Color: As selected by Architect from manufacturer's full range of minimum 12 colors.
B. Support Members:
   1. Countertop support brackets: Epoxy powder coated, 11 gauge steel with integral cleat mount opening and wire management opening.
   2. Undercounter support frames: Epoxy powder coated.
   3. Table Legs with adjustable foot:
      a. Product: E-Leg, Item No. 635.68.971 manufactured by Hafele.
      b. Height: 28 inches.
      c. Diameter: 2 inches.
C. 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.
D. Concealed Joint Fasteners: Corrosion-resistant, standard with manufacturer.
E. Grommets: Standard plastic or rubber grommets for cut-outs, in color to match adjacent surface. Diameter: 3-5/8 inches
F. Sealant for Use in Casework Installation: Type 6, See Section 07 92 00 .

PART 3 EXECUTION

3.01 PREPARATION

A. Large Components: Ensure that large components can be moved into final position without damage to other construction.

3.02 EXAMINATION

A. Site Verification of Environmental Conditions:
   1. Do not deliver casework until the following conditions have been met:
      a. Building has been enclosed (windows and doors sealed and weather-tight).
      b. An operational HVAC system that maintains temperature and humidity at occupancy levels has been put in place.
      c. Ceiling, overhead ductwork, piping, and lighting have been installed.
      d. Installation areas do not require further “wet work” construction.
B. For Base Cabinets Installation: Examine floor levelness and flatness of installation space. Do not proceed with installation if encountered floor conditions required more than 1/2 inch (13 mm) leveling adjustment. When installation conditions are acceptable, for each space, establish the high point of the floor. Set and make level and plumb first cabinet in relation to this high point.
C. For Wall Cabinets Installation: Examine wall surfaces in installation space. Do not proceed with installation if the following conditions are encountered:
   1. Maximum variation from plane of masonry wall exceeds 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more, and/or maximum variation from plumb exceeds 1/4 inch (6 mm)per story.
   2. Maximum Variation of finished gypsum board surface from true flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.
D. Verify adequacy of support framing and anchors.
E. Verify that service connections are correctly located and of proper characteristics.
F. Condition casework to average prevailing humidity conditions in installation areas prior to installing.

3.03 INSTALLATION

A. Perform installation in accordance with manufacturer's instructions.
B. Use anchoring devices to suit conditions and substrate materials encountered. Use concealed fasteners to the greatest degree possible. Use exposed fasteners only where allowed by approved shop drawings, or where concealed fasteners are impracticable.
C. Set casework items plumb and square, securely anchored to building structure.
D. Align cabinets to adjoining components, install filler and/or scribe panels where necessary to close gaps.
E. Fasten together cabinets in continuous runs, with joints flush, uniform and tight. Misalignment of adjacent units not to exceed 1/16 inch (1.6 mm). In addition, do not exceed the following tolerances:
   1. Variation of Tops of Base Cabinets from Level: 1/16 inch (1.6 mm) in 10 feet (3 m).
   2. Variation of Faces of Cabinets from a True Plane: 1/8 inch (3 mm) in 10 feet (3 m).
   3. Variation of Adjacent Surfaces from a True Plane (Lippage): 1/32 inch (0.8 mm).
   4. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch (1.6 mm).
F. Base Cabinets: Fasten cabinets to service space framing and/or wall substrates, with fasteners spaced not more than 16 inches (407 mm) on center. Bolt adjacent cabinets together with joints flush, tight, and uniform.
G. Install hardware uniformly and precisely.
   1. Install drawer pulls horizontally.
   2. Install door pulls vertically.
H. Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind.

I. Countertops: Install countertops intended and furnished for field installation in one true plane, with ends abutting at hairline joints, and no raised edges.
J. Replace units that are damaged, including those that have damaged finishes.

3.04 ADJUSTING

A. Adjust operating parts, including doors, drawers, hardware, and fixtures to function smoothly.

3.05 CLEANING

A. Remove and dispose of all packing materials and related construction debris.
B. Clean casework and other installed surfaces thoroughly. Clean cabinets inside and out. Wipe off fingerprints, pencil marks, and surface soil etc

3.06 PROTECTION

A. Do not permit finished casework to be exposed to continued construction activity.
B. Protect casework and countertops from ongoing construction activities. Prevent workmen from standing on, or storing tools and materials on casework or countertops.
C. Repair damage, including to finishes, that occurs prior to Date of Substantial Completion, using methods prescribed by manufacturer; replace units that cannot be repaired to like-new condition.

3.07 COLOR SELECTION:

A. Laminate Color Selection: From Wilsonart, Formica, Nevamar and Chem Metal standard and premium colors.
   1. Allow for up to five (5) laminate color selections for project.
B. Hinge and Pull Color Selection: From manufacturer's standard
C. Miscellaneous Hardware Color Selection (support brackets, table frames, rail): From manufacturer's standard.
D. 1mm PVC Edge Banding Color Selection: From manufacturer's standard of colors matching decorative laminate.
E. 3mm PVC Edge Banding Color Selection: Match decorative laminate color selection.

END OF SECTION 12 34 00

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SECTION 12 36 00
COUNTERTOPS, BACKSPLASHES AND WINDOW STOOLS

PART 1 GENERAL

1.01 SECTION INCLUDES
- A. Countertops for manufactured casework.
- B. Wall-hung counters and tops.
- C. Solid surface window stools.
- D. Solid surface wall protection.

1.02 RELATED REQUIREMENTS
- A. Section 123400 - Plastic Laminate Casework
- B. Section 22 40 00 - Plumbing Fixtures: Sinks.

1.03 REFERENCE STANDARDS
- A. ANSI A208.1 - American National Standard for Particleboard 2022.
- B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2023.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2023c.
- 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 2019.

1.04 SUBMITTALS
- A. See Section 01 30 00 - 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. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- F. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- G. Installation Instructions: Manufacturer's installation instructions and recommendations.
- H. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.05 QUALITY ASSURANCE
- A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

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. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.

1. Laminate Sheet: NEMA LD 3, Grade HGS, 0.048 inch (1.2 mm) nominal thickness.
   a. Finish: Matte or suede, gloss rating of 5 to 20.
   b. Surface Color and Pattern: As indicated.
2. Exposed Edge Treatment: 3 mm edge banding, machine applied and machine profiled to 1/8 inch radius. Color as selected from manufacturers standard range of minimum 15 colors.
3. Back and End Splashes: Same material, same construction.
4. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Custom Grade.

C. Solid Surfacing Countertops, Window Stools, and Wall Protection: Solid surfacing sheet or plastic resin casting over continuous substrate.

1. Flat Sheet Thickness: 1/2 inch (12 mm), minimum typical.
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) Avonite Surfaces: www.avonitesurfaces.com.
      2) Dupont: www.corian.com.
      3) Formica Corporation: www.formica.com.
      4) Wilsonart: www.wilsonart.com/#sle.
      5) Substitutions: See Section 01 60 00 - 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.
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; eased edge top and bottom.
5. Back and End Splashes: Same sheet material, square top; minimum 4 inches (102 mm) high.
6. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Premium Grade.

D. Stainless Steel Countertops: Type 304, stainless steel sheet; 16 gauge, 0.0625 inch (1.59 mm) nominal sheet thickness.

1. Finish: 4B satin brushed finish.

2. Exposed Edge Shape: Marine edge with return; edge raised 3/16 inch (5 mm) above counter with 45 degree transition, minimum 1 inch (25 mm) flat rim; 1-1/2 inch (38 mm) high turndown, 1/2 inch (12 mm) return to face of case; reinforced with hardwood or steel.
3. Back and End Splashes: Same material; welded 1/4 inch (6 mm) radius coved joint to countertop; square top edge with 1 inch (25 mm) wide top surface and minimum 1/2 inch (12 mm) turndown.
4. Splash Dimensions: 4 inch (100 mm) high by 1 inch (25 mm) thick, unless otherwise indicated.
5. Sinks: Same material, same thickness; flush welded to counter; bottom sloped to outlet; radiused interior corners; drain outlet located in back corner.

2.02 MATERIALS

A. Wood-Based Components:
1. Wood fabricated from old growth timber is not permitted.
2. Provide sustainably harvested wood, certified or labeled; see Section 01 60 00 - Product Requirements.

B. 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.

C. Particleboard for Supporting Substrate: ANSI A208.1 Grade 2-M-2, 45 pcf (20 kg/cu m) minimum density; minimum 3/4 inch (19 mm) thick; join lengths using metal splines.

D. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

E. Joint Sealant: Mildew-resistant silicone sealant, clear.

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 and wall panels up to 144 inches (3,657 mm) long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.

D. Stainless Steel: Fabricate tops up to 144 inches (3,657 mm) long in one piece including nosings and back and end splashes; accurately fitted mechanical field joints in lengths over that dimension are permitted.
1. Weld joints; grind smooth and polish to match.
2. Provide stainless steel hat channel stiffeners, welded or soldered to underside, where indicated on drawings.
3. Provide wall clips for support of back/end splash turndowns.
4. Sound Deadening: Apply water resistant, fire resistant sound deadening mastic to entire bottom surface.

5. Integral sinks: Fabricate with corners rounded and coved, double-walls for sink compartment partitions. Factory-punch holes for fittings, and weld sinks to countertops.

E. 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. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch (16 mm).
C. Attach stainless steel countertops using stainless steel fasteners and clips.
D. 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 12 36 00

SECTION 12 61 13 – FIXED AUDIENCE SEATING

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 DEFINITIONS

A. Furnish – supply equipment to the project for use or installation by others.
B. Install – install equipment provided to the project by others.
C. Provide – supply and install equipment.

1.03 WORK INCLUDED

A. Provide fixed theatre seating and related items, as indicated on the drawings, specified here, and as required to complete the installation.

1.04 RELATED WORK

A. Related work which is not part of the Fixed Seating Contract includes, but is not limited to, the following:
   1. Auditorium floors.
   2. Demountable platforms.
   3. Handrails and guardrails.
   4. Electrical services and connections.
   5. Electrical connection to aisle lights.
   6. HVAC System

1.05 ACCEPTABLE MANUFACTURERS

A. The following are acceptable manufacturers:
   1. Hussey Seating Company
      38 Dyer Street Extension
      North Berwick, Maine 03906
      Tel: (207)-676-2271
   2. Irwin Seating Company
      PO Box 2429
      3251 Fruit Ridge Road NW
      Grand Rapids MI 49504
      (616) 784-2881
   3. Wenger Corporation
      555 Park Drive
      Owatonna, MN 55060
      507.774.8570

1.06 QUALITY ASSURANCE

A. Product reference: See section 2.1 below and refer to the Design Intent drawings for design details. (if applicable)
B. The installation shall comply with the applicable requirements of the laws, codes, ordinances and regulation of the Federal, State and Municipal authorities having jurisdiction.
C. Seating manufacturer shall verify that minimum clearances shall meet ADAAG (ADA Accessibility Guidelines for Buildings and Facilities) regulations and local code.

1.07 SUBMITTALS

A. If product coordination shop drawings or seating layout review is required more than three times because of seating manufacturer's failure to incorporate earlier comments, all subsequent reviews will be charged on a time and materials basis to the seating manufacturer.
B. Shop drawings shall be of uniform size, bound and include the following:
    1. Title sheet listing all sheets in the submittal.
    2. Scale plans and elevations.
    3. All information necessary to explain fully the design features, appearance, function, fabrication, installation, and use of components in all phases of operation.
    4. Country or origin for equipment not manufactured in the United States.
C. Product coordination shop drawings shall include the following:
    1. Complete plans for all levels indicating dimensions to aisle light stub-ups.
    2. Details showing methods of seat installation and anchorage, relationship to adjacent work and complete setting diagrams.
    3. Detail sections and elevations for each different seat condition, showing back pitch, viewer eye location, and clear distance from adjacent seat or guardrail with the seat both up and down, and (where applicable) the relationship to the adjacent riser or wall.
    4. Hinged end standard details.
    5. Removable seat details, including means of attachment to demountable platforms, if applicable.
    6. Details of aisle lighting connections, including connections for seats on platforms and removable seats.
D. Submit product development sample following approval of product coordination shop drawings. Fabrication shall not commence until the Theatre Consultant, the Architect, and the Owner determine that the product coordination shop drawing and sample are in compliance with the design intent of the Contract Documents.
E. Following approval of the product coordination shop drawings and once accurate as-built field measurements of the seating areas can be obtained, submit the seating layout for approval. The seating layout shall include the following:
    1. Complete seating plans for all levels, showing all seats, seat sizes, locations of base structures, aisle widths, end standards, transfer arms, and aisle lights.
    2. Field measurements and survey information. Seating layout will not be approved unless all dimensions have been field verified.
F. Submit complete manufacturer's product data for all work in this Section, consisting of complete product description and specifications, catalog cuts, laboratory test results, installation instructions, maintenance instructions, and other data required for product approval and use.
G. Submit the following detail samples for approval:
    1. 8-inch square minimum piece of wood in the species and finish specified, for both solid and laminated applications.
    2. 3-inch square minimum piece of metal in the finish specified.
    3. 12-inch square minimum piece of each fabric type of the material specified.
    4. Seat number and row letter plate.
H. The product development sample shall be complete in every respect, including upholstery and finishes. The architect reserves the right to request replacement samples or portions of the samples until the appropriate party's approval has been obtained. The samples may not be incorporated in the final installation. Samples shall remain the property of the Owner/Operator.

I. Submit written approval of the proposed seating as required from all building, safety, and fire officials and agencies having jurisdiction over the work. Copies of all such approvals shall be delivered to the appropriate party and the Owner prior to installation.

J. Provide an instruction and maintenance manual in a 3-ring binder for the Owner at time of installation. In addition, provide electronic copies on thumb drives for the Owner, Architect and Theatre Consultant. Electronic copies shall be in PDF format. The manual shall include:
   1. Manufacturer and installer contact information.
   2. Spare parts list and source information, including upholstery fabric.
   3. Recommended procedures for cleaning, touch-up and maintenance of all finished surfaces and upholstery, including all precautions against materials and methods which could damage upholstery fabric and/or its fire retardance characteristics.
   4. Catalog cuts for standard equipment
   5. "As-built" drawings showing all seating as installed.

K. Provide a full attic-stock inventory list.

1.08 WARRANTY

A. Warrant the equipment in this Section to be free of defective components, faulty workmanship and improper installation and adjustment for a period of 5 years after acceptance of the completed installation by the Owner. Items showing evidence of defective materials or workmanship shall be repaired and replaced at no cost to the Owner within 15 days of notification. Rectify conditions that might present a hazard to human life or property within 48 hours of notification. The Warranty shall not cover the results of normal use, nor shall it cover damage due to neglect or improper use or vandalism.

PART 2 PRODUCTS

2.01 PRODUCT REFERENCE

A. Product reference for the fixed seating is as follows or equal:
   1. Irwin Seating Model "Citation", which includes the following:
      a No. 12 Upholstered, self-rising 3/4-fold seat with black injection molded pan.
      b No. 90 Citation molded plastic back with upholstered front.
      No. 10 enclosed end standard with veneer surfaced insert panel.
      Steel center standards.
      e Standard solid maple hardwood arm rests with comfort curve profile.
   2. Hussey Seating Company Model "Quattro Traditional" detailed as above is a pre-approved equal.

2.02 METAL COMPONENTS

A. Metal components shall be of sufficient gauge and designed to withstand normal use and abuse.

B. Metal components shall have smooth surfaces, including cut edges. Grind all welded connections smooth. Cut plate parts shall have dressed edges.

C. All exposed metal parts, including bolts and hardware, shall be powder-coated steel with a hybrid thermosetting powder coat finish. The powder coat finish shall be applied by electrostatic means to a thickness of 2 - 2.5 mils and shall provide a durable coating having a 2H Pencil hardness. Prior to powder coating, metal parts shall be treated with a five-stage bonderization process for superior finish adhesion, and after coating shall be oven baked to cause proper flow of the epoxy powder to result in a smooth, durable finish.

D. Paint colors shall be determined by the Architect from within Manufacturer's standard color range. Paint application shall be of sufficient film depth to afford wear resistance of institutional quality.

2.03 WOOD

A. Plywood, whether exposed or concealed, shall be hardwood. Plywood shall be hot press laminated (16 plies per inch thickness minimum) using high frequency process. Interior plies shall be Maple, Class 3 or better. Exposed, exterior plies shall be select veneer Maple, Class 1, continuous, and selected as to color. Plies shall be of equal thickness, without voids or defects affecting appearance or performance.

B. Milled maple shall be clear, well-seasoned stock, containing no defects affecting appearance or performance, and shall be selected as to color.

C. Wood species shall be North American Maple.

2.04 WOOD FINISHES

A. All exposed wood parts shall be stained to the color selected by Architect from within the Manufacturer's standard color range and provided with a high-quality furniture finish, produced with two top coats of high density clear lacquer following stroke-sanding of raw wooden parts, sealing, and light preparatory sanding prior to both lacquer top coats. Film depth must be sufficient to afford wear resistance of institutional quality.

B. If field applied, wood finishes shall meet the requirements of Section 01415: VOC Limits for Adhesives, Sealants and Paints. The maximum allowable VOC content for lacquer is 275 grams/liter.

2.05 PADDING

A. Seat and back padding material shall be of new (prime manufacture) open cell, medium density polyurethane foam. Padding material shall comply with the flammability requirements outlined in the California Technical Information Bulletin #117, Resilient Cellular Materials, Section A & D, dated February 1975, when tested in accordance with Federal Test Method Standard 191, Method 5903.2.

2.06 FABRICS

A. Seat Cushion Upholstery fabric shall be selected from the manufacturer's standard line:
   a Successful bidder shall provide a memo-sized sample booklet for the Architect's use.
   b An 8-inch square minimum fabric sample of the selected fabric shall be submitted with relevant manufacturer and dye lot information.

B. Seat fabric material shall meet Class 1 flammability requirements of the U.S. Department of Commerce Commercial Standard 191-53 per Bulletin #117 and to applicable local codes. (Include Bulletin #133 for Boston or California)

C. Seat fabric shall meet wearability criteria – double rub – Wyzenbeek 100,000, heavy duty test.

2.07 SEAT PANS

A. Seat pans shall be self-rising, gravity return or compression spring. Self-rise shall be essentially silent.

B. Seat cushions shall be fully upholstered, with glass-filled, injection molded polypropylene pan fully enclosing the hinge mechanism.

C. Fabric covering sewn into box construction shall be without welts and securely attached without the use of staples, tacks or screws. Lock the first and last 1-1/2 inches of stitching. Fabric shall extend a minimum of 3/8-inch past the stitching.

D. Pivot and stop mechanisms shall be totally enclosed. All stops shall have neoprene pads for quiet operation.
E. Plastic seat pan shall be of a color chosen from the manufacturer's standard line.
F. Foam seat cushions shall contain a minimum of 23-1/2 inches of molded polyurethane foam.
G. Seat pans should incorporate seat number identification plates, centered and recessed in the leading edge of the seat pan. Plates shall be natural satin anodized stamped aluminum with engraved black numbers and concealed/ tamper proof fixation hardware.

2.08 SEAT BACKS

A. Fabricate the chair backs as padded, upholstered components with molded black plastic outer back.
B. Back inside wood upholstery panel shall be of plywood of not less than 5-ply construction and not less than 5/16” thick.
C. Where inside upholstered panels and exposed back panels connect, they shall be formed on the same radius and mounted to each other using concealed fasteners.
D. Foam back cushions shall be minimum of 1□ inches and max of 2 □ inches thick polyurethane foam cemented to the inside panel and covered with back fabric as outlined above.
E. All plastic component finishes shall match.

2.09 ARM RESTS

A. Armrests shall be solid Maple as per Architect’s sample and finished to match end standard. Armrests will be mounted onto metal standards. Armrests will have 2 keyhole slots to lock onto dovetail lugs on standards and one security screw.
B. The armrest must be capable of being fitted as a transfer armrest where necessary, as shown on drawings. The shape of these transfer armrests will have no visible difference to the non-transfer armrests. The transfer armrests will have natural satin anodized stamped aluminum plates to identify them with an ADA international insignia. Transfer armrests shall be mounted so that the hinge and hardware are hidden.
C. End-standard armrests shall incorporate concealed aisle lights as described below and located as indicated in Electrical Drawings.
D. End-standard armrests should incorporate row identification plates recessed in arm. Plates shall be natural satin anodized stamped aluminum with engraved black lettering and concealed/ tamper proof fixation hardware.

2.10 STANDARDS

A. Standards shall be floor mount 14-gauge (minimum) steel structure.
B. Center standards shall be modern pedestal welded steel design fabricated of 14-gauge steel to a 1” x 3” vertical rectangular column. Brackets for seat support shall be 7 gauge MIG-welded to pedestal. Wing plates for mounting backs to be 14 gauge steel. A 14 gauge steel foot shall be welded to bottom of column, all around column, and concealed on inside. Any protruding anchorage rod shall be capped with acorn nuts or approved equivalent. The standard shall be fabricated to be compatible with floor incline and to maintain seat and back height regardless of slopes. Standards shall be painted black.
C. Provide hinged end-standards (transfer arms) where shown on the drawings.
D. End-standards with transfer arms shall be of the same style and construction as normal end-standards with slight modification as necessary to accommodate hinges, floor slopes, and removable seating requirements.

E. End standards shall have row identification plates. Plate finish shall match seat identification plate.
F. The end panels are to be minimum □-inch thick plywood with maple veneer and a 2-inch wide X □-inch thick solid block front, and shall be finished to match the back and seat bottom. End panel will be mounted onto metal standards.

2.11 AISLE LIGHTS

A. Aisle lights shall be low voltage LED non-hazardous fixtures, utilizing a miniature element in sufficient quantity to provide adequate illumination (minimum 2/10 foot candle) for floor and steps adjacent to the end-standards. The light assembly shall be recessed under the end-standard armrest, concealed from sight and protected from damage. The standard shall be completely pre-wired with an 18-inch lead extending beyond the standard.
B. Provide each standard with a 18" black flex-steel conduit connector through which the lead passes. Low-voltage cabling may use approved non-steel black flexible sleeving.
C. Provide dimmable transformers, suitably housed in steel safety enclosures and equipped with primary and secondary fuses, terminal blocks, and safety disconnects. The transformers shall be in a remote location, as shown on the Electrical drawings.
D. All electrical components shall be UL approved.
E. Wiring connections from the electrical distribution system to the end standards, as well as installation and connection of the voltage reduction device shall be by the Electrical Contractor.
F. Provide quantity and location of aisle lights as indicated in architectural drawings.

2.12 IMPACT CRITERIA

A. Seats shall be capable of withstanding the repeated impact of a 40-pound sand bag dropped onto the seat pan from a height of 12 inches. The front edge of the seat pan shall not drop more than 3/4 inch.
B. The seats shall be certified to withstand a 600 lbs. static load, laterally distributed three inches from the leading edge of the seat. The seat shall also be certified to pass seat cycle oscillation testing, ASTM Designation F851-87 Test Method for Self-Rising Seat Mechanism, and sandbag testing.
C. Seats shall be capable of withstanding without failure the repeated impact of two 40-pound sandbags suspended 10 inches below the top of the chair back and on both sides of the chair back.

2.13 SEATING LAYOUT

A. Provide seats of varying widths with standards in each row spaced laterally so that the end standards will be in alignment from the first to last row, whether aisles are of constant or varying widths. The average seat width shall be at least 21 inches. Seating shall be staggered to optimize sightlines. Seat width distribution and seat quantities indicated on the Seating Drawings (TS-xxx) shall be reviewed and confirmed by the manufacturer.
B. Final seating layout shall be determined based on actual field conditions and measurements. If field conditions warrant a change in the seating layout, the Architect and Theatre Consultant shall be notified before installation. Changes in the layout shall be documented and approved by the Architect and Theatre Consultant prior to installation.

2.14 REMOVABLE SEATS

A. Provide removable seats where shown on the drawings.
B. A maximum of 3 seats shall be ganged.

C. Each removable seat or gang of seats for wheelchair viewing positions shall have self-contained arms.
D. Each removable seat or gang of seats shall have a quick-release device for attachment to floor. This shall consist of a thumbscrew and insert with threaded connection.
E. Provide a sled base for each removable seat, or group of seats.
F. The plug and receptacle for removable seats are to be furnished by the Seating Manufacturer and shall be NEMA ML-1P midget locking plugs. They shall be installed by the Electrical Contractor. The manufacturer shall coordinate with the Electrical Contractor, immediately upon receipt of approved shop drawings, the type and quantity of connectors required.

2.15 MAINTENANCE MATERIALS

A. Provide cut and sewn seat and back covers for 1 percent of the seating installed, per venue. Covers shall be produced at the same time, using identical fabric and shall be presented to the Owner upon completion of the seating installation. Cover sizes and colors shall be prorated according to the seating sizes in the final layout.
B. Provide an additional 20 yards per fabric for each type of upholstery, and each type shall be of the same dye lot as the balance of the project.
C. Provide complete spare chairs components for 1 percent of the installed seating, proportional to each configuration of seat supplied (e.g. removable seats, transfer arm seats, 20” seats, 21” seats, 22” seats, balcony back angle seats, orchestra back angle seats, etc.), with a minimum of 10 chairs per type/size, and a minimum of 1 piece per component.

PART 3 EXECUTION

3.01 PREPARATION

A. Before beginning the installation, check all construction and substrate materials to receive the seating to assure that they are sound, rigid, properly sized and located, level (or properly sloped), plumb and square, and that there is nothing to prevent proper and timely execution of the installation. All overhead work, including painting, staining, and finishing shall be finished prior to start of chair installation. Concrete floors shall have a clear 3” of 3000 psi concrete above top of metal deck fluting.
B. Do not proceed until unsatisfactory conditions have been corrected. Start of work shall indicate acceptance of the substrate and surrounding conditions.

3.02 PROTECTION OF EQUIPMENT

A. Protect the materials in this Section from soiling and damage during all phases of the work, from the time of manufacture to installation.
B. Cover the seats to protect them from dust, paint, carpet installation, and debris as required during and after installation.

3.03 COORDINATION

A. The Contractor is responsible for reviewing all drawings, specifications, and field conditions which affect the work in this Section. Notify the Architect whenever field measurements, analysis of the drawings and specifications, or progress of other trades indicates that the work in this Section cannot be completed as specified or as scheduled.
B. Within 6 weeks of the award of contract, and prior to the preparation of shop drawings, the Fixed Theatre Seating Contractor shall submit a written review of related work as it appears on the Contract Documents. The review shall identify errors, omissions or obstructions related to

the installation and operation of the equipment in this Section. The sole intent of this written review is to identify potential problems as soon as possible. It is understood that some errors, omissions or obstructions may not be evident until the Contractor prepares shop drawings.

3.04 INSTALLATION

A. Installation shall be by the manufacturer or an authorized dealer or agent of the manufacturer. All installation work shall be carried out under the supervision of a capable superintendent experienced in the installation of seating of similar type and quality.
B. Coordinate the installation schedule as required with related trades.
C. Coordinate the cutting and coring of air supply and return holes with related trades, if applicable.
D. Commencement of installation means acceptance of site conditions.
E. The installation shall conform to the approved shop drawings and layout drawings and to the printed installation instructions of the manufacturer.
F. Floor anchorages shall be of sufficient strength and capacity to assure safe, rigid, and permanent attachment.
G. All related work for installation, such as drilling, coring, and cutting through finish floor materials in place at the time of installation shall be done as work of this Section.
H. Upon completion of the installation, adjust all operating parts and assemblies for proper quiet operation. Clean and polish all exposed surfaces.
I. Adjust seats as required to assure that seats in each row are aligned when in upright position.

3.05 CLEANING AND REPAIR

A. Remove all cartons, wrappings and debris associated with the installation from the building and legally dispose of same.
B. Upon completion of the installation, touch-up all marred finishes with coating to match factory-applied finish. Replace any unit whose finish cannot be restored to high quality appearance, in the opinion of the Architect and Theatre Consultant.
   If field applied, wood finishes shall meet the requirements of Section 01415: VOC Limits for Adhesives, Sealants and Paints. The maximum allowable VOC content for lacquer is 275 grams/liter.
C. Replace upholstery which has been damaged in installation. Replacement of upholstery shall not deplete the extra materials stock.
D. Upon completion of the installation, leave all areas of installation broom clean.

3.06 DEMONSTRATION

A. Installed seating shall be inspected for quality by the Owner, the Architect and the Theatre Consultant.
B. Any necessary adjustments or modifications shall be made as required to comply with approved shop drawings.
C. Owner’s designated staff or representatives shall be instructed in the care and maintenance of all items.
D. Tests and instruction to be scheduled in conformance with project construction schedules and the availability of the Owner, the Architect, the Acoustics Consultant, and the Theatre Consultant, pending on-time approvals of all prior requirements.
E. Cost of reinspection and additional testing by the Architect or the Theatre Consultant, if required due to lack of completion and/or errors and omissions made by the manufacturer or

installer shall be paid by the Seating Contractor or the General Contractor respective to the area of work concerned. This work will be conducted on a time and materials basis, including the Architect's and the Theatre Consultant's standard hourly rates, and shall be scheduled and approved in writing prior to the reinspection/testing session between 1) the Architect, the Theatre Consultant and the Owner, and 2) the Owner and the contractor(s).

END OF SECTION

SECTION 12 66 23 - TELESCOPING BLEACHERS

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 WORK INCLUDED

A. In the Gymnasium, provide wall-attached telescoping bleachers and related items as indicated on the drawings, specified here, and as required to complete the installation.

1.03 RELATED WORK

A. Section 12 66 23 – Telescoping Chair Platforms: Telescoping audience seating in the Auditorium.

1.04 REFERENCES

A. American Plywood Association (APA)
   1. DOC PS 1-09, Structural Plywood.

B. American Society for Testing and Materials (ASTM)
   1. ASTM A 36/A 36M-19, Standard Specification for Carbon Structural Steel.
   2. ASTM A 653/A 653M-20, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   3. ASTM A 500-21a, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
   4. ASTM A 501-21, Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
   5. ASTM A 513-20a, Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
   6. ASTM A 1008/A 1008M-21a, 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.
   7. ASTM A 1011/A 1011M-18a, 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.
   8. ASTM B 221/B 221M-21, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

C. American Welding Society (AWS)
   1. AWS D1.1-2020, Structural Welding Code – Steel.
   2. AWS D1.3-2018, Structural Welding Code – Sheet Steel.

D. International Code Council (ICC)
   1. ICC 300-2017, Standard on Bleachers, Folding and Telescopic Seating, and Grandstands.

E. National Fire Protection Association (NFPA)
   1. NFPA 102-2021, Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures.

F. Southern Pine Inspection Bureau (SPIB)
   1. 2021 Standard Grading Rules for Southern Pine Lumber.

1.05 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design telescoping stands, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Telescoping stands shall withstand the effects of gravity loads and loads and stresses within limits and under conditions indicated according to ICC 300 and NFPA 102.

1.06 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for telescoping stands.

B. Shop Drawings: For telescoping stands in both stacked and extended positions. Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

C. Samples for Initial Selection: For units with factory-applied finishes.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Decking: 6-inch square Samples of finished material.
2. Metal Components: 6-inch square Sample of each color and finish indicated.
3. Seating: 6-inch square Sample of each seating material, color, and finish indicated.

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

1.07 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer & professional engineer.

B. Welding certificates.

C. Product Certificates.

1.08 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For telescoping stands to include in operation and maintenance manuals.

1. Precautions for cleaning materials and methods that could be detrimental to telescoping stand finishes and performance.

1.09 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," and AWS D1.3, "Structural Welding Code - Sheet Steel."

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Standard: Provide telescoping stands to comply with ICC 300 & NFPA 102.

E. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.10 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings and construction contiguous with telescoping stands by field measurements before fabrication. Verify locations of walls, columns, and other construction that will interface with operating telescoping stands.

PART 2 PRODUCTS

2.01 MATERIALS

A. Wood
   1. Lumber: Kiln dried, surfaced four sides; southern pine complying with SPIB's "Standard Grading Rules for Southern Pine Lumber" for grade-of-finish requirements.
   2. Plywood: APA-grade trademarked, DOC PS 1.

B. Steel
   1. Structural-Steel Shapes, Plates, and Bars: ASTM A 36/A 36M.
   2. Galvanized-Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation.
   3. Uncoated Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold-rolled commercial steel), or ASTM A 1011/A 1011M, Designation CS (hot-rolled commercial steel).
   4. Tubing: ASTM A 500, cold formed; ASTM A 501, hot formed; or ASTM A 513, mechanical.

C. Extruded Aluminum: ASTM B 221 (ASTM B 221M), alloy as standard for manufacturer.

2.02 TELESCOPING STANDS

A. General: Operable systems of multiple-tiered seating on interconnected folding platforms that close, without being dismantled, into a nested stack for storing. Stand units permit opening and closing of adjacent rows, allow individual and collective rows to be locked open for use, and close with vertical faces of upper skirts on the same vertical plane.

B. Wall-Attached Telescoping Stands: Forward-folding system, in which the bleachers open in the forward direction by initially moving the front row away from the stack to the fully extended position, and the rear of bleacher understructure is permanently attached to wall construction.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Irwin Seating’s “VersaTract” or a comparable product by one of the following:
      a. Hussey Seating Company.
      b. Interkal LLC.
      c. Kodiak Industries Ltd.
   2. Row Spacing: 26”
   3. Row Rise: 10” nominal.
   4. Motor Operation: Manufacturer’s standard drive mechanism, using motor adequately sized for the purpose.
      a. All electrical components and wiring to be UL listed. Provide all wiring internal to bleacher units, to junction box located where indicated, ensure that wiring is not energized except during operation.
         1) Electrical Characteristics: Three-phase power per manufacturer's requirements.
      b. Controls: Start, Stop, Forward and Reverse in a single control unit.
      c. Limit Switches: Automatically stop integral power system when telescoping stands reach fully opened or closed positions.
      d. Motion Monitor: Flashing light with self-contained warning horn, rated at 85 dB at 10 feet, mounted under telescoping seating for audio and visual warning during integral power operation.

e. Transformer: As required to coordinate current characteristics of motor and control station with building electrical system.
f. Remote Control: Removable plug-in low-voltage pendant station, with first-row plug-in location for each monitor.

5. Design Loads: Design to withstand the following loading conditions.
   a. Live Load on Structural Supports: 100 psf, minimum, of gross horizontal projection.
   b. Live Load on Seats and Walking Surfaces: 120 pounds per linear foot.
   c. Lateral Sway Stress on Structural Supports: 24 pounds per linear foot of seat plank.
   d. Perpendicular Sway Stress on Structural Supports: 10 pounds per linear foot of seat.
6. Structural Supports: Steel or aluminum; manufacturer's standard wheeled carriages supporting each tier separately, with moving parts permanently lubricated and metal parts cushioned to prevent metal-to-metal contact during operation.
   a. Design each row carriage so that it will individually support the design loads and is self-supporting when fully assembled without dependence on platform panels or boards, seats, or fascia.
   b. Welding: In accordance with AWS D1.1 and AWS D1.3.
   c. Bolting: Use lock-washers or locknuts
   d. Wheels: Minimum 5" diameter by 1-1/8" inch wide, with non-marring rubber tires; ball, roller, or oil-impregnated metal bearings; minimum or 2 wheels at each floor support.
   e. Row Locking: Automatically mechanically lock each carriage to adjacent carriages when fully extended.
   f. Unlocking: Automatically unlock all rows before engaging retraction mechanism.

2.03 COMPONENTS

A. Benches: Seats and skirts.
   1. Manufacturer and and model line: Infinity Seating Module by Irwin or equal.
   2. Bench Height: Not less than 16 inches or more than 18 inches
   3. Bench Depth: 10 inches
B. Wheelchair-Accessible Seating: Locate seating cutouts to provide wheelchair-accessible seating at locations indicated on Drawings.
   1. Equip tiers adjacent to wheelchair-accessible seating with front rails as required by referenced safety standard.
   2. Equip cutouts with full-width front closure panels that match decking construction and finish and that extend from underside of tiers adjacent to cutouts to 1-1/2 inches from finished floor.
C. Deck: 3/4" clear coat plywood.
D. Extended Rear Deck Filler: Provide an extended rear deck filler mounted between rear wall building columns. Provide appropriately sized rear filler on each bleacher to allow for a continuous row of seating at the top row.
E. Risers: Steel sheet with manufacturer's standard rust-inhibiting coating or hot-dip galvanized finish.
F. Safety Rails: Structural steel, finished with manufacturer's standard powder coat system.
   1. Folding / Self-storing mid-aisle handrails located at centerline of each vertical aisle with seating on both sides.
   2. End rails (guards) that are telescoping and self-storing.
   3. Back rails (guards) along rear of units where required by referenced safety standard.
   4. Color: As selected by Architect from manufacturer's standard colors

G. Understructure: Structural steel.
   1. Finish: Manufacturer's standard.
H. Support Column Wheels: Nonmarring, soft, rubber-face wheel assembly under each support column.
   1. Include wheels of size, number, and design required to support stands and operate smoothly without damaging the flooring surface, but no fewer than four per column or less than 3-1/2 inches in diameter and 1 inch wide.
I. Fasteners & Anchorage: Vibration proof, in manufacturer's standard size and material.

2.04 ACCESSORIES

A. Steps
   1. Slip-resistant, abrasive tread nosings at vertical aisles.
   2. Intermediate aisle steps, fully enclosed, at each vertical aisle.
   3. Transitional top step, fully enclosed, at each vertical aisle where last row of telescoping stands is adjacent to a cross aisle.
   4. Removable front steps, fully enclosed, at each vertical aisle, that engage with front row to prevent accidental separation or movement and are equipped with a minimum of four skid-resistant feet.
B. Closure Panels and Void Fillers
   1. Aisle closures at foot level that produce flush vertical face at aisles when system is stored.
   2. End panels covering exposed ends of stands in the stored position.
   3. Panels at cutouts and truncations for accessible seating.
   4. Rear fillers including supports for closing openings between top row and rear wall of adjoining construction.
   5. Gap fillers for closing openings between stand units or between stand units and adjoining construction.
C. Signage: Accessibility signs at each accessible space and accessible aisle seat.

2.05 FABRICATION

A. Fabricate understructure from structural-steel members in size, spacing, and form required to support design loads specified in referenced safety standard.
B. Weld understructure to comply with applicable AWS standards.
C. Round corners and edges of components and exposed fasteners to reduce snagging and pinching hazards.
D. Form exposed sheet metal with flat, flush surfaces, level and true in line, and without cracking and grain separation.
E. Seating Supports: Fabricate supports to withstand, without damage to components, the forces imposed by use of stands without failure or other conditions that might impair the usefulness of seating units.
   1. Cantilever bench seat supports to produce toe space uninterrupted by vertical bracing.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine areas where telescoping stands are to be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install telescoping stands to comply with referenced safety standard and manufacturer's written instructions.

3.03 ADJUSTING AND CLEANING

A. On completion of installation, lubricate, test, and adjust each telescoping stand unit so that it operates according to manufacturer's written operating instructions.

B. Clean installed telescoping stands on exposed and semi-exposed surfaces. Touch up shop-applied finishes or replace components as required to restore damaged or soiled areas.

3.04 DEMONSTRATION

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

END OF SECTION

SECTION 12 66 23 – TELESCOPING CHAIR PLATFORMS

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 WORK INCLUDED

A. The work in this Section includes all labor, materials and equipment to furnish and install the telescopic seating system described here and shown on the Contract Drawings.

B. Provide telescopic riser units and all accessory items required to achieve the seating configurations shown on the Contract Drawing. Accessory items include, but are not limited to, guardrails and steps.

1.03 RELATED WORK

A. Related Work: Related work includes, but is not limited to, the following:

1. Theatre and storage area floors.
2. Electrical service and interconnections

1.04 WARRANTY

A. Warrant the equipment in this Section to be free of defects in materials and workmanship for a period of 5 years after acceptance of the completed installation by the Owner. Defective work shall be repaired and replaced at no cost to the Owner. The Warranty shall not cover the results of normal use, nor shall it cover damage due to neglect or improper use of the equipment.

1.05 SUBMITTALS

A. Submit shop drawings for fabrication and installation. Include plans, elevations, and details as required. Indicate materials, methods, finishes, attachments, and accessory items.

B. Submit verification that the floor is properly constructed and suitable for all phases of the telescopic riser operation.

C. Shop drawings shall indicate the load imposed on the floor when the riser is in both the extended and retracted positions, as well as the load imposed when the unit is raised on its transport wheels and moved across the floor.

D. The Manufacturer shall employ a registered, licensed engineer to certify that equipment supplied meets or exceeds the design criteria of the Contract Documents.

E. Provide samples of chair colors and fabrics, carpet, colored plastic, and painted material for the Architect's review.

F. Provide the Owner with an operation and maintenance manual.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. The telescopic riser system shall be manufactured by one of the following:

1. Audience Systems
   19B Washington Rd.
   West Wilts Trading Estate
   Westbury Wiltshire, BA13 4JP
   Tim Whiting
   610-644-3157

2. Hussey Seatway
   3 Centurian Way
   Crusader Park
   Warminster Wiltshire, BA12 8BT
   Logan Grier
   410-638-6358

2.02 FINISHES

A. Metal parts shall be free from rust, scale, dirt, and welding spatter. All weldments or other metal components shall receive a coat of corrosion resistant primer prior to finish coating and component assembly.
B. The steel understructure and risers shall be painted with corrosion resistant, low gloss enamel. Color: black.
C. Visible aluminum components, including nosings, shall have black powder-coated finish.
D. All exposed bolt and rivet heads shall be black or painted black.

2.03 DESIGN CRITERIA

A. Telescopic seating platform system shall be designed to support, in addition to its own weight, and the weight of added accessories, a uniformly distributed live load of not less than 100 lbs. per square foot of gross horizontal projection.
B. Telescopic seating shall be designed to withstand a sway force applied to seats of 24 pounds per linear foot parallel to the seats and 10 pounds per linear foot perpendicular to the seats. Sway forces shall not be considered simultaneously applied.
C. Railings, posts and sockets shall be designed to withstand the following forces applied separately:
   1. A concentrated load of 200 pounds at any point and in any direction along the top railing member and;
   2. A uniform load of 50 pounds per foot applied horizontally at the required guardrail height and simultaneous uniform load of 100 pounds per foot vertically downward at the top of the guardrail. The concentrated and uniform loading conditions shall not be required to be applied simultaneously.
D. American Institute of Steel Construction (AISC), American Iron and Steel Institute (AISI) and Aluminum Association (AA) design criteria shall be the basis for calculation of member sizes and connections.
E. Wood members shall be designed in accordance with National Forest Products Association, (NFOPA), and National Design Specification for Wood Construction.

2.04 DESCRIPTION

A. The telescopic riser system shall consist of multiple tiers of closed deck chair platforms. Platforms shall be operable on the telescopic principal, stacking vertically in minimal floor area when not in use. All rows shall be mechanically locked, operable only when unlocking and cycling the first row. Each platform row shall be comprised of a closed decking component, a complete set of supportive frames, braces and upholstered, integral chairs.
B. The first moving row shall be secured with both friction and mechanical locks. All other rows shall be mechanically locked, operable only upon unlocking and cycling of the first row.

2.05 FABRICATION

A. Steel supports and rolling frames shall be constructed of formed steel shapes of the size and shape necessary to support the design loads.

B. Wheels shall not be less than 6 inch non-marring soft rubber face to protect wood or synthetic floor surfaces. Each operating row shall have a minimum of 6 wheels.
C. Wheel channels shall be continuously in contact with adjacent channels by nylon guides, to eliminate metal to metal contact, and non-binding guide rods to provide alignment when opening and closing.
D. Cantilever arms shall be equipped with a heavy duty roller to assure adequate row to row support and smooth operation. Cantilever arms shall be field adjustable.
E. Vertical columns shall be structural tube to meet design criteria.
F. Deck supports shall be bolted to the rear beam, nose, and deck board with locking hardware. Supports shall be equipped with a heavy duty roller to assure adequate row to row support and smooth operation.

2.06 AISLE STEPS

A. Aisle steps shall be permanently attached, closed design. The front step shall be hinged for storage on first row deck without the need for removal.

2.07 CARPETING

A. Risers and decks shall be carpeted with 26-ounce commercial grade, low level, looped olefin fiber carpet with polypropylene backing. Color to be selected from manufacturer’s standard.

2.08 AISLE HANDRAILS

A. Removable aisle railings shall be an individual rail design, located on both sides of every row. Rail pockets that that protrude beyond the face of the riser while in the closed position, or railings with blunt, non-turned ends will not be allowed.
B. Provide storage carts or integrated storage hooks within the stored unit for railings.

2.09 AISLE LIGHTS

A. Aisle lights to be located as shown on the drawings or as required for code compliance.
B. Lights shall be low voltage. Provide dimming transformers, controls, and wiring as required.

2.10 CHAIRS

A. Chairs shall have blow mold plastic backs and seats with padded, upholstered inserts, and plastic armrests. Fabric shall be selected by the Architect from the manufacturer's standard.
B. Chairs shall be provided in 20, 21 and 22 inch widths to achieve staggered seating and even row ends.
C. Chairs shall be beam-mounted for integral fold-down operation. Chair seats shall be fully cantilevered and hinged at the rear. Seats shall be self-rising to a uniform 3/4 safety fold.
D. Chairs shall be ganged in groups, and manually raised and lowered. Chair operation shall be semi-automatic, where counterbalanced chairs are manually raised and lowered in groups with a maximum of 14 chairs.
E. Provide row letters and seat numbers.

2.11 CARPETING

A. Carpeted decking shall be 26 ounce commercial grade, low level, looped olefin fiber carpet with polypropylene backing. Apply carpet with to 5/8 inch carpet grade plywood. Color to be selected from manufacturer’s standard.
B. Nosing shall be one piece, formed, 14 gauge steel with black powder coated finish.
C. Nosing with panelam or carpeted decks shall be aluminum extrusion. Finish to be black anodized.

2.12 EXTENSION / RETRACTION SYSTEM

A. Risers shall open and close, by the friction drive system, as a complete unit. The manufacturer will determine the number of power units required based on the group length and number of rows involved. Hinging of the lower skirt board is not acceptable.
B. Each power unit shall use two large 6" diameter by 9 1/2" long tubes with non-marring 1/2" thick rubber covering to grip floor for opening and closing.
C. The power units shall develop tractive forces adequate to operate risers under normal conditions but inadequate to operate should significant obstacles be encountered.
D. Manufacturer shall provide all wiring from power source within riser seating including pendant control. Removable pendant control shall be handheld with forward and reverse button, plugging into a single receptacle. Electrical contractor shall provide power source behind the seating as shown on the electrical plans. Amperage to be as specified by seating manufacturer depending on the number of power units required. For wall-attached installations, power source to terminate in a surface mounted junction box above floor. For reverse units; power source to terminate in a junction box, flush mounted under first seating row in center of group. Electrical contractor shall perform the connections to the seating equipment at the junction box. All electrical parts and wiring shall be installed in complete accord with the National Electric Code. ALL SYSTEMS SHALL BE DESIGNED TO COMPLY WITH U.L. (U.L. Listing #E168517)

PART 3 EXECUTION

3.01 COORDINATION

A. The Contractor is responsible for reviewing all drawings, specifications, and field conditions which affect the work in this Section. Notify the Architect whenever field measurements, analysis of the drawings and specifications, or progress of other trades indicates that the work in this Section cannot be completed as specified or as scheduled.

3.02 JOB CONDITIONS

A. The Manufacturer is responsible for the equipment fitting the intended spaces without interference.
B. The Manufacturer shall visit the site and verify all dimensions and existing conditions. The Manufacturer shall survey the floor and advise the Architect of any irregularities which will adversely affect the operation of the telescopic riser system.
C. The Manufacturer shall be familiar with the work of adjoining trades and coordinate with their work.

3.03 PROTECTION OF EQUIPMENT

A. Protect the equipment in this Section from damage and deterioration, including rust, during all phases of the work, from the time of manufacture to installation.
B. Notify the General Contractor or Construction Manager in writing of jobsite conditions that would adversely affect the equipment after installation. Do not install the equipment if jobsite conditions beyond the control of the RiserContractor will result in damage or deterioration, including rust.
C. Rust resulting from flaws in manufacturing and finishing shall be covered under the Warranty.

3.04 INSTALLATION

A. Install the risers in accordance with the Manufacturer's instructions and approved shop drawings.
B. Adjust all equipment for smooth and proper operation.

C. At the end of each day during the installation period, remove all refuse and scrap materials to designated collection points. Upon completion of the installation, leave all areas broom clean.

3.05 REPAIRS

A. Repair any work or finishes that are damaged during installation by the Contractor for the work in this Section. This includes work in this Section and the work of others. Where the work of others is damaged, reimburse the appropriate contractor for the repair.

3.06 PUNCHLISTING

A. The Contractor shall work with the General Contractor or Construction Manager to arrange for a punchlisting period for the work in this Section. Punchlisting shall consist of a minimum of one 8-hour day. The building schedule shall be such that no other conflicting or obstructing activity is taking place. The Contractor shall deploy the units in each of the configurations shown on the Contract Drawings. The Contractor shall provide sufficient labor for the required service.

3.07 TRAINING

A. The Manufacturer shall conduct a demonstration and instruction session to assist the Owner in becoming familiar with the completed installation, and to personally instruct representatives of the Owner in the proper operation and maintenance of all equipment provided.

END OF SECTION

SECTION 12 93 00 - SITE FURNISHINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES
- A. Bicycle racks.
- B. Removable bollards.

1.02 RELATED REQUIREMENTS
- A. Section 033000 - Cast-in-Place Concrete: Mounting surface for bicycle racks.
- B. REFERENCE STANDARDS
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2020.
- E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2021a.

1.03 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. Installation methods.
- C. Shop Drawings: Indicate size, shape, and dimensions, including clearances from adjacent walls, doors, and obstructions.
- D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.

1.04 DELIVERY, STORAGE, AND HANDLING
- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Handle racks with sufficient care to prevent scratches and other damage to the finish.

PART 2 - PRODUCTS

2.01 MANUFACTURERS
- A. Outdoor Bicycle Racks
  1. Secure Site Design, LLC: http://www.securesitedesign.com
  2. Substitutions: See Section 016000 - Product Requirements.
- B. Decorative Removable Bollards
  1. Landscape Forms, Inc.: http://www.landscapeforms.com
  2. Substitutions: See Section 016000 - Product Requirements.

2.02 BICYCLE RACKS
- A. Outdoor Bicycle Racks
  1. Product: Secure Site Design BRWS-101.
  2. Description: Single wide loop bike rack constructed of 2-3/8 in. (60mm) OD tubular steel pipe. 2 3/8” OD tubular steel.
  3. Mounting, Ground: In-ground anchor.
  4. Finish: Powder coat, maintenance-free and weather-resistant.
  5. Color: As selected by Architect from manufacturer's complete range.

6. Accessories: In-ground grout cover.

B. Materials
1. Pipe: Carbon steel, ASTM A53/A53M, Schedule 40.
2. Tube: Carbon steel, ASTM A500/A500M.
3. Bar, Round and Flat, Carbon Steel: ASTM A36/A36M.

2.03 DECORATIVE REMOVABLE BOLLARDS

A. Decorative Removable Bollards
1. Product: Landscape Forms “Annapolis” Bollard
2. Size: 6 inch nominal diameter
a. Outer Diameter Pipe Size: 6.625 inches.
b. Wall Thickness: 0.280 inches.
3. Mounting: Removable with embedded socket.

B. Materials
1. Bollard Tube: Structural steel tube, ASTM A 500, Grade B.
2. Bollard Top: Aluminum casting.
3. Cover Ring: Spun aluminum, type 5052-H32, 0.160 thickness.
4. Removable Bollard Socket: All socket components except the bottom cap are hot dip galvanized.
a. Tube:
1) Structural steel tube, ASTM A 500, Grade B.
2) Nominal Pipe Size: 8 inches (8.625-inch outside diameter by 0.322-inch wall thickness).
b. Cover Plate: 2-piece, 1/4-inch carbon steel plate, stores in socket.
5. Removable Bollard Latching Mechanism:
a. Latch: 1/8-inch, Type 304 stainless steel.
b. Latch Pin: 1/4-inch diameter by 1/2-inch stainless steel clevis pin with cotter ring.
c. Latch Mounting Bracket: 3/16-inch thick by 1.00-inch, Type 304 stainless steel bar.
d. Lock:
1) CompX Fort Lock #MFWDS23078-221 keyed alike.
2) Keys: 2, brass.
6. Finish on Metal, Except Removable Bollard Socket:
a. Primer: Rust inhibitor.
b. Topcoat: Thermosetting polyester powder coat. UV, chip, and flake resistant.
c. Color: As selected by Architect from manufacturers full range.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine surfaces to receive site accessories.
B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
C. Do not begin installation until unsatisfactory substrates have been properly repaired.

3.02 PREPARATION

A. Ensure surfaces to receive site accessories are clean, flat, and level.

3.03 INSTALLATION - BICYCLE RACKS

A. Install in accordance with manufacturer's instructions.
B. Install bicycle racks level, plumb, square, and correctly located as indicated on drawings.
C. In-Ground Anchor Installation:

1. Prepare holes in size according to manufacturer’s instructions.
2. Place anchoring bolts through the holes in the pipe.
3. Lower rack into holes, ensuring the bottom of lower bends are at least 1-1/2 inch from the ground.
4. Pour concrete and level rack.
5. Support until dry.

3.04 INSTALLATION - BOLLARDS

A. Install in accordance with manufacturer's instructions.

B. Install bollards plumb.

C. Embed sockets for removable bollards securely in concrete.

3.05 CLEANING

A. Clean installed work to like-new condition. Do not use cleaning materials or methods that could damage finish.

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

SECTION 14 20 13 - HYDRAULIC HOLELESS PASSENGER ELEVATOR

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Complete elevator systems and installation.

1.02 RELATED SECTIONS

A. Division 1 - Temporary Facilities and Controls: Temporary power supply.
B. Section 03 30 00 - Cast-in-Place Concrete: Elevator pit foundation.
C. Section 04 20 00 - Unit Masonry Assemblies: Masonry hoistway enclosure; building-in and grouting hoistway door frames.
D. Section 05 50 00 - Metal Fabrications: Pit ladder, Sill supports, sump pit cover, and overhead hoist beams.
E. Section 07 13 00 - Sheet waterproofing of elevator pit walls and floor.
F. Division 21 - Fire Suppression Sprinklers: Sprinkler heads in hoistway.
G. Division 22 - Plumbing Equipment: elevator sump equipment.
H. Division 26 - Electrical service for elevators up to and including shunt trip, breaker, and disconnect switches at machine room door.
I. Division 27 - Voice and Data Communication: Cabling for telephone service to elevators.
J. Additional scopes to be provided by others:
    1. Fire Detection and Alarm: Heat detectors in shafts and machine rooms for disconnection of power from elevator equipment before sprinkler activation and for connection to elevator controllers.
    2. Access control: Card readers at elevator call stations.

1.03 REFERENCES

A. All current applicable codes including IBC, NFPA 101 and ANSI A117.1/ADAAG and State ADA requirements.
B. ASME A17.1 - Safety Code for Elevators and Escalators; The American Society of Mechanical Engineers, current edition adopted by Authority Having Jurisdiction.
C. ASME A17.2 - Guide for Inspection of Elevators, Escalators, and Moving Walks; The American Society of Mechanical Engineers, current edition adopted by Authority Having Jurisdiction.
D. DSFPR Part 5, Chapter 1, Section I-15.1: All passenger elevators in a building shall be provided with a cab sized to accommodate an ambulance cot 24 inches by 84 inches in its horizontal open position.
    1. A cot in the horizontal position outside the elevator shall travel into the elevator without having to modify the position.
    2. Once the cot is in place in the cab, there shall be room for at least two (2) EMS attendants.

1.04 SUBMITTALS

A. See Division 1 for submittal procedures.
B. Submit shop drawings. Indicate the following information:
    1. Locations of machine room equipment: driving machines, controllers, governors and other component.
    2. Hoistway components: Car, counterweight, sheaves, machine and sheave beams, guide rails, buffers, ropes, and other components.

3. Rail bracket spacing; maximum loads imposed on guide rails requiring load transfer to building structural framing.
4. Individual weight of principal components; load reaction at points of support.
5. Clearances and over-travel of car and counterweight.
6. Location and sizes of access doors, doors, and frames.
7. Applicable seismic design data.
8. Interface with building security system.
9. Electrical characteristics and connection requirements.

C. Show arrangement of equipment in machine room so equipment can be removed for repairs or replaced without disturbing other components. Arrange equipment for clear passage through access door.

D. Submit product data. Provide data on the following items:
1. Signal and operating fixtures, operating panels, indicators.
2. Cab design, dimensions, layout, and components.
3. Cab and hoistway door and frame details.
4. Electrical characteristics and connection requirements.

E. Samples: For initial selection, submit samples form manufacturer's standard selection. For verification, submit two samples, 3" square of sheet material or 4" length of running trim illustrating cab interior finishes, cab and hoistway door and frame finishes, and handrail material and finish.

F. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for elevator system being provided.

G. Maintenance Data. Include:
1. Parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
2. Technical information for servicing operating equipment.
3. Legible schematic of hydraulic piping and wiring diagrams of installed electrical equipment and changes made in the Work. List symbols corresponding to identity or markings on machine room and hoistway apparatus.

H. Maintenance Tools and Diagnostic Equipment:
1. It is the intent of this specification to allow for the Owner’s non-proprietary maintenance of elevators and equipment.
2. Where specialized diagnostic tools or equipment are required in order to maintain elevator and elevator equipment, provide these tools and equipment to the Owner at project closeout.
3. Include diagnostic software, access codes, passwords and other proprietary information as necessary in order to interface with elevator equipment.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with applicable code and as supplemented in this section.

B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten years documented experience.

C. Installer Qualifications: Company specializing in performing the work of this section and approved by elevator equipment manufacturer.

D. Regulatory Requirements: Comply with ASME A17.1 and elevator design requirements for earthquake loads in ASCE 7. Peale velocity acceleration (Av) Spectral response acceleration (Sds) /seismic design category to meet requirements for Odessa Campus zip code 19734.

1. Elevator importance factor is 1.

E. Source Limitations: Obtain elevators through one source from a single manufacturer.
   1. Provide major elevator components, including pump-and-tank units,plunger-cylinder assemblies, controllers, signal fixtures, door operators, car frames, cabs, and entrances, manufactured by a single manufacturer
   2. Where required to meet non-proprietary maintenance requirements, alternative manufacturers will be considered provided the basis-of-design manufacturer requirements are met.

F. Accessibility Requirements: Comply with Section 4.10 in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)

G. Fire-Rated Hoistway Entrance Assemblies: Door and frame assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing at as close to neutral pressure as possible according to NFPA 252.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle materials, components and equipment in manufacturer's protective packaging.

B. Store materials, components, and equipment off of ground, under cover, and in a dry location. Handle according to manufacturer's written recommendations to prevent damage, deterioration, or soiling.

1.07 COORDINATION

A. Coordinate installation of sleeves, block outs, and items that are embedded in concrete or masonry for elevator equipment. Furnish templates and installation instructions and deliver to Project site in time for installation.

B. Coordinate sequence of elevator installation with other work to avoid delaying the Work.

C. Coordinate locations and dimensions of other work relating to hydraulic elevators including pit ladders, sumps, and floor drains in pits; entrance subsills; and electrical service, electrical outlets, lights, and switches in pits and machine rooms.

1.08 PRE-INSTALLATION MEETING

A. Review schedule of installation, installation procedures and conditions, and coordination with related work.

1.09 WARRANTY

A. See Division 1 Section - Closeout Procedures, for additional warranty requirements.

B. Provide full parts and labor warranty for period specified below.
   1. Warranty Period: Two (2) years from date of Substantial Completion.

1.10 MAINTENANCE SERVICE

A. Owner/User training: Provide digital video recorded training session for routine maintenance. Recording (DVD) shall be given to Owner.

B. Provide service and maintenance of elevator system and components for two (2) years from Date of Substantial Completion. Provide service during normal working hours.

C. Continuing Maintenance Proposal: Provide a continuing maintenance proposal from Installer to Owner, in the form of a standard one-year; two-year & five-year maintenance agreement,

starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

D. Perform maintenance work using competent and qualified personnel under the supervision and in the direct employ of the elevator manufacturer or original installer.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Product: Holeless hydraulic passenger elevator, 3500 lb capacity, of minimum dimensions to meet gurney transportation requirements.

B. Acceptable Manufacturers:
   1. Delaware Elevator.
   2. ThyssenKrupp Elevator.
   3. Otis Elevator Co.
   4. Schindler Elevator Corp.
   5. Canton Elevator.

C. Substitutions: See Division 1 Section - Product Requirements.
   1. All operating components to be manufactured by same entity, unless otherwise indicated.
   2. Where required to meet non-proprietary maintenance requirements, alternative manufacturers will be considered provided the basis-of-design manufacturer requirements are met.

2.02 ELEVATOR

A. Type: Dual Two-Stage Piston Holeless.

B. Rated Load: 3500 pounds.

C. Rated Speed: 125 feet per minute.

D. Configuration, Openings, and Travel
   1. Refer to Drawings.
   2. Ambulance cot accommodation: Coordinate locations, dimensions, and profiles of all elements to comply with the requirements of DSFPR Part 5, Chapter 1, Section I-15.1.

E. Operation System: Single automatic.
   1. Power Supply: 460 volt, 3 phase, 60 Hz.

F. Motor Rating: 40 horsepower.

G. Additional controls: Restricted use.
   1. Provide for card reader access control at each elevator landing.
      a. Card reader by others. Coordinate through CM for requirements.
   2. Coordinate key card operations with Owner.

H. Auxiliary Operations:
   1. Battery-powered lowering.

2.03 HOISTWAY ENTRANCE

A. General
   1. Provide manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories.

B. Clear Door Opening Dimensions
   1. Width: 3’-6”.
   2. Height: 7’-0”.

C. Materials and Fabrication: Provide manufacturer's standards, but not less than the following:
   1. Frames: Stainless steel, #4 finish, profile to coordinate with hoistway wall construction.

2. Doors: Flush, hollow-metal construction; fabricated from stainless-steel sheet, 5WL textured finish.
3. Sight Guards: Provide sight guards on doors, finish to match door edges.
4. Sills: Extruded aluminum, with grooved surface.
5. Non-shrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.

2.04 CAR

A. General
1. Provide steel-framed car enclosures with non-removable wall panels, with car roof, access doors, power door operators, and ventilation.
2. Provide standard railings complying with ASME A17.1 on car tops where required by ASME A17.1.

B. Dimensions
1. Platform and cab shell
a. Width: 7’-0”.
b. Depth: 6’-3”.
c. Height: 8’-0”.
2. Clear inside dimensions
a. Minimum Width: 6’-8”.
b. Minimum Depth: 5’-5”.
c. Ceiling Height: Minimum 7’-6”.

C. Materials and Finishes
1. Shell
a. Canopy: 14 gauge steel, powder coated.
b. Emergency exit: Provide as required by code.
2. Floor
a. Car Sill: Extruded aluminum, with grooved surface.
b. Subfloor: Underlayment grade, exterior plywood, 5/8-inch (16-mm) nominal thickness.
c. Floor Finish: Prepared to receive resilient tile (specified in Division 9 Section "Resilient Floor Tile").
3. Walls
a. Bases: Stainless steel, recessed.
b. Panels: Applied plastic laminate, color/pattern as selected by Architect.
c. Panel binders, reveals, and frieze: Stainless steel, #4 finish.
d. Handrails
1) Material: Stainless steel, #4 finish.
2) Profile: Rectangular, 3/8” by 2”.
3) Quantity: Three (3).
4. Ceiling
a. Panel drop ceiling, stainless steel, #4 finish.
b. Recessed LED downlights.
5. Door, return, columns, and transom: Stainless steel, #4 finish.

D. Additional Requirements
1. Two-speed exhaust fan in car canopy controlled by key switch in car operating panel.
2. Infrared curtain unit (ICU) door protection.
3. Pad hooks with two complete sets of full-height vinyl cab pads.
4. Inspection certificate mounted under acrylic cover with frame of stainless steel, #4 finish.

2.05 SIGNAL EQUIPMENT

A. General
   1. Fixture package shall feature and vandal-resistant design in stainless steel, #4 finish.
   2. Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled.

B. Halls
   1. Digital Hall Position Indicator at main egress floor.
   2. Push-Button Stations: One at each landing with the following.
      a. Manufacturer's standard vandal-resistant recessed units with exposed face plates.
      b. Provisions for one card reader at each push button station.
         1) Card readers shall be provided by others.

C. Cars
   1. Car Control Station
      a. Provide manufacturer's standard recessed car control station. Mount in return panel adjacent to car door unless otherwise indicated.
      b. Mark buttons and switches with standard identification for required use or function that complies with ASME A17.1. Use both tactile symbols and Braille.
      c. Provide "No Smoking" sign matching car control station, either integral with car control station or mounted adjacent to it, with text and graphics as required by authorities having jurisdiction.
   2. Car Position Indicator
      a. Provide digital-type car position indicator, located above car door or above car control station.
      b. Provide audible signal to indicate to passengers that ear is stopping at floor served.
      c. Include travel direction arrows if not provided in car control station.
   3. Emergency Communication System
      a. Provide system that complies with ASME A17.1 and the U.S. Architectural & Transportation Barriers Compliance Board's Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities (ADAAG).
      b. System shall include the following features.
         1) System provides two-way voice communication without using a handset and provides visible signals that indicate when system has been activated and when monitoring station has responded.
         2) System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
         3) On activation, system dials preprogrammed number of monitoring station and identifies elevator location to monitoring station.

2.06 EMERGENCY POWER

A. Arrange elevator operation to operate under emergency power when normal power supply fails.
B. Emergency Power Supply: Self-contained battery power.
C. Upon transfer to emergency power, advance elevator to a pre-selected landing, stop car, open doors, disable operating circuits, and hold in standby condition.

2.07 MACHINE ROOM FITTINGS

A. Wall-Mounted Frames: Glazed with clear plastic; sized as required. Provide one for master electric and hydraulic schematic and one for lubrication chart. Install charts.
B. Key Cabinet: Wall-mounted, lockable, keyed to building keying system, for control/operating panel keys.
   1. Provide two extra control/operating panel keys.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.
B. Verify that hoistway, pit, and machine room are ready for work of this section.
C. Verify hoistway shaft and openings are of correct size and within tolerance.
D. Verify location and size of machine foundation and position of machine foundation bolts.
E. Verify that electrical power is available and of the correct characteristics.

3.02 PREPARATION

A. Arrange for temporary electrical power for installation work and testing of elevator components.

3.03 INSTALLATION

A. Install system components. Connect equipment to building utilities.
B. Provide conduit, boxes, wiring, and accessories.
C. Mount machines on vibration and acoustic isolators, on bed plate and concrete pad. Place on structural supports and bearing plates. Securely fasten to building supports. Prevent lateral displacement.
D. Accommodate equipment in space indicated.
E. Install guide rails using threaded bolts with metal shims and lock washers under nuts. Compensate for expansion and contraction movement of guide rails.
F. Accurately machine and align guide rails. Form smooth joints with machined splice plates.
G. Coordinate installation in hoistway wall construction.
H. Install hoistway door sills, frames, and headers in hoistway walls. Grout sills in place. Set entrances in vertical alignment with car openings and aligned with plumb hoistway lines.
I. Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; prime two coats.
J. Machine Room Components: Clean and degrease; prime one coat, finish with one coat of enamel.
K. Adjust equipment for smooth and quiet operation.

3.04 ERECTION TOLERANCES

A. Guide Rail Alignment: Plumb and parallel to each other in accordance with ASME A17.1.
B. Cab Movement on Aligned Guide Rails: Smooth movement, with no objectionable lateral or oscillating movement or vibration.

3.05 FIELD QUALITY CONTROL

A. Acceptance testing:
    1. Acceptance Testing: On completion of elevator installation and before permitting use (either temporary or permanent) of elevators, perform acceptance tests as required and recommended by ASME A17.1 and by governing regulations and agencies.
    2. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times tests are to be performed on elevators.
B. Demonstration
    1. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate elevator. Refer to Division 1 Section "Demonstration and Training." Professionally record training session & provide owner with digital video tape or DVD.

2. Check operation of elevator with Owner's personnel present and before date of Substantial Completion. Determine that operation systems and devices are functioning properly.
3. Check operation of elevator with Owner's representative present not more than one month before end of warranty period. Determine that operation systems and devices are functioning properly.

C. Testing and inspection by regulatory agencies will be performed at their discretion.
1. Schedule tests with agencies and notify Owner and Architect.
2. Obtain permits required to perfonn tests.
3. Document regulatory agency tests and inspections in accordance with the requirements of Division 1 Section - Quality Requirements.
4. Perform tests required by regulatory agencies.
5. Furnish test and approval certificates issued by authorities having jurisdiction.

3.06 ADJUSTING

A. Adjust for smooth acceleration and deceleration of car so not to cause passenger discomfort.
B. Adjust automatic floor leveling feature at each floor to achieve 1/4 inch from flush.

3.07 CLEANING AND PROTECTION

A. Remove protective coverings from finished surfaces.
B. Clean surfaces and components ready for inspection.
C. Do not permit construction traffic within cab after cleaning.

END OF SECTION