Hillview Elementary
Additions and Alterations
PDE # 3897
PlanCon Part E
Outline Specifications
November 1, 2017
SECTION 02 4119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
   1. Demolition and removal of selected portions of building.
   2. Repair procedures for selective demolition operations.
   3. Salvage of existing items to be reused or recycled.

B. Related Sections:
   1. Division 01 Sections “Summary of Multiple Contracts” and “Temporary Facilities and Controls” for responsibilities by each Contract for removals.
   2. Division 01 Section "Execution" for cutting and patching procedures.
   3. Division 20 through 26 Sections for additional requirements for demolishing, cutting, patching, or relocating mechanical and electrical items.
   4. Division 31 Section “Clearing and Grubbing” for removal of vegetation and topsoil and selected site elements.

PART 2 - PRODUCTS

2.01 REPAIR MATERIALS

A. Use repair materials identical to existing materials.
   1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
   2. Use materials whose installed performance equal or surpass that of existing materials.

B. Comply with material and installation requirements specified in individual Specification Sections.
SECTION 02 8000 - ASBESTOS INTERIOR ABATEMENT

PART I - GENERAL

1.01 STIPULATIONS

A. References herein to “Contractor”, “Asbestos Abatement Contractor” or “AAC” refer to the properly certified personnel employed directly under the General Construction Contract.

B. The procedures specified in this section are for minimum performance. Variations to the stipulated work procedures will only be accepted through written approval by Professional Service Industries, Inc. (PSI). The AAC is responsible for conformance to regulatory codes, rules and guidelines. The AAC is required to obtain all permits, licenses and approvals to perform the work, including any rights to use patented systems.

1.02 SCOPE OF WORK

A. A survey for asbestos-containing materials (ACM) was conducted between January 28, 2106 at the Hillview Primary located at 482 East Main Street, Grove City, Pennsylvania, by PSI and a survey report prepared by accredited individuals. The survey report was used to identify the types and general locations of ACMs within the building.

B. The work includes removal and disposal of asbestos-containing floor tile and associate mastic, mastic associated with non-ACM flooring, built up roofing material.

C. The scope of work for this project covers the filing of required notifications, landfill charges, supplying of all labor, tools, materials, equipment, services and appurtenances to accomplish the work below. The work shall be performed to the complete satisfaction of the Grove City School District (Owner), Architect and the Environmental Consultant in accordance with the current Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA) regulations, the Pennsylvania Department of Labor and Industry (PA DL&I) and the Department of Environmental Protection (DEP) regulations and any other applicable Federal, State and Local Government regulations. The AAC should perform the abatement in accordance with the most stringent of the regulations provided.

D. There must be at least three (3) state licensed workers and one (1) state licensed supervisor present and working at all times during the scheduled shifts. The AAC must have written approval from the Environmental Consultant and the Owner to use less than five certified workers for a specific reason. In addition, sufficient manpower must be provided to maintain the overall project schedule.

E. Submit required documentation in accordance with Owner’s “Submittal Procedures”. Copy all communication to Owner and Environmental Consultant.

1. SDS/MSDS Submittal will not be acted upon by Owner, but may be accepted as Information Submittals.

The determination of the exact amount of asbestos-containing materials present is solely the responsibility of the AAC.
Work under this project includes, but is not limited to, the following Proper Removal and Disposal of the following asbestos-containing materials:

<table>
<thead>
<tr>
<th>Material Description</th>
<th>Material Locations</th>
<th>Estimated Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Built up Roofing</td>
<td>Center Roof (Cafeteria)</td>
<td>3,200 SF</td>
</tr>
<tr>
<td>12” Floor Tile with Black Mastic</td>
<td>Mechanical Room A134, Storage A130, Main Office Storage Rooms A112 and A113, Storage Rooms, B215 (B-23), B204 (B-21), B205 (B-22), B219 (B-25), B220 (B-24), Janitor Room (near elevator) B209, Office B216, Seminar Room B207 (B-2), Special Education Room B206 (B-1)</td>
<td>2,760 SF</td>
</tr>
<tr>
<td>Brown Mastic Associated with Non ACM Flooring</td>
<td>Stairs B1, B2 (1st and 2nd floors)</td>
<td>600 SF</td>
</tr>
</tbody>
</table>

F. AAC is responsible for all demolition required to access ACMs. AAC shall be responsible for removing any and all fixed furniture, cabinets, mechanical or electrical equipment, to access ACMs. Coordinate with the General Contractor (GC) if disconnects to mechanical or electrical equipment are required to access ACMs.

G. Floor tile mastic may be removed by either shot blast or low odor chemical solvent. If the shot blast method is utilized, a full containment enclosure must be constructed. A full containment enclosure requires 6 mil. polyethylene criticals over vents, windows, piled and stacked school items, etc. and full 6 mil. polyethylene floor to ceiling walls. Prior to final clearance full walls will be taken down and discarded, criticals to remain in place.

H. After final clearance has been achieved, the GC will neutralize all floors where the chemical solvent mastic remover has been used. The GC must have architect approval of the neutralizer to be used.

I. All loose furnishings and fixtures in the work areas will be removed by the school district prior to abatement activities. Coordinate with the GC if there are remaining or additional items that need removed from the work areas.

J. AAC is to include in the bid price and supply all means necessary to access ACMs (1.03)
PART 2 - PRODUCTS

2.01 EQUIPMENT AND MATERIALS

A. The list of required materials will include, but is not necessarily limited to the following:

1. Respirators: Provide respiratory protection in accordance with OSHA Regulation 29 CFR 1926.1101 and ANSI Z88.2-1980. Respiratory protection shall be as listed below. There shall be NO EXCEPTION to this requirement. No employee or visitor shall enter the area without this protection until all visible asbestos has been removed from this area. Employees or visitors shall wear this type respirator. Respirators shall be NIOSH/MSHA approved.

2. Protective Clothing: Provide only disposable protective clothing with material composition of layered polypropylene or spunbonded polyethylene nonwoven material. Disposable protective clothing is to be worn once and disposed of as asbestos-contaminated waste upon exiting from the work area. Suits shall have zipper front and attached hood and shoe covers. “Tyvek” by DuPont, or approved equal are acceptable disposable coveralls. Gloves will be worn for hand cover as required.

3. Wetting Agents: The asbestos material will be sprayed with water containing an additive to enhance penetration. The additive, or wetting agent, will be polyoxyethylene at a concentration of one (1) ounce per five (5) gallons of water, or equal. A fine spray of this solution must be applied to prevent fiber disturbance preceding the removal of the asbestos material. The asbestos will be sufficiently saturated to prevent emission of airborne fibers in excess of the exposure limits prescribed in the current OSHA standards referenced in these specifications. Dry removal will not be allowed except with written approval.

4. Polyethylene sheeting: Actual thickness must be six (6) mils, for vertical protection (walls, doors, windows) and for all other uses (floors, fixed equipment, HVAC supply and return openings). Industry Standard “6 mil” sheet is not acceptable.

5. Polyethylene bags (with warning labels) six mil (.006”) minimum for disposal. All asbestos that is removed shall be double bagged.

6. Tape: High quality vinyl or fabric duct tape.

7. Negative Pressure Filtration Equipment: Air movement and filtering equipment equipped with HEPA filters rated at 99.97% removal down to 0.3 microns, and of sufficient capacity to provide a minimum of four (4) air changes per hour for each active work area.

8. Airless Spray Equipment: Electric airless spray equipment for saturating and mist fiber control. Low-pressure (500 psi) equipment must be available on-site and utilized as required.

9. Vacuum: HEPA rated for surface cleaning and housekeeping. Hand operated and power tools such as, but not limited to, saws, scorers, abrasive wheels and drills should be provided with local exhaust ventilation systems with HEPA filters.

10. Hand tools: Brooms, plastic shovels, scrapers, brushes, etc., in sufficient quantity to ensure the appropriate level of housekeeping.
11. Water Filtration System: Shower and contaminated water filtration system.

12. GFI Equipment: All electrical connectors in the work area must be through "ground fault" protected outlets/circuits.


14. Chemical methods are to be utilized for this project for flooring adhesive removal.

15. SDS/MSDS for all materials shall be submitted to Independent testing agency and kept on site.

2.02 PERSONNEL PROTECTION

A. Personnel protection is required for laborers, mechanics, supervision and visitors at the work site during the set-up and abatement operations.

B. Each worker shall be supplied with a minimum of two (2) complete protective work clothes and respirator filter changes per day for the complete duration of the project. Hard hats should be available as appropriate which meet ANSI Z-89.1 standards. Safety toe footwear is to be worn underneath the disposable or recyclable shoe covers and must meet the requirements and specifications in ANSI Z-41-1. Eye wear and face protection must meet the standards and specifications of ANSI Z-87.1.

C. In addition to sets of protective work clothes for workers, the Contractor shall have on hand two (2) additional sets of disposable work clothes per day for personnel who are authorized to inspect the work site. Hard hats should be available as appropriate which meet ANSI Z-89.1 standards. Safety toe footwear is to be worn underneath the disposable or recyclable shoe covers and must meet the requirements and specifications in ANSI Z-41-1. Eye wear and face protection must meet the standards and specifications of ANSI Z-87.1.

D. Respirators approved for asbestos use and protective work clothes will be worn by laborers and mechanics as a minimum during set-up operations (plastic draping, light-fixture dropping or removal, etc.).

E. Appropriate respirators will be worn by all personnel in the active work area.

F. Upon leaving the active work area, filters will be discarded, cartridges removed and respirators cleaned in disinfectant solution and clean water rinse.

G. Clean respirators will be stored in plastic bags when not in use.

H. Respirators will be inspected daily for broken, missing, or deteriorated parts.

END OF SECTION 02 8000
SECTION 03 3000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1. Footings.
2. Grade beams
3. Foundation walls.
4. Slabs-on-grade (ground).
5. Suspended slabs.
6. Concrete toppings.
7. Building walls.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

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

1. ACI 301.
2. ACI 117.
3. ACI 315, "Details and Detailing of Concrete Reinforcement

2.2 FORM-FACING MATERIALS

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

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
   a. High-density overlay, Class 1 or better.
b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
c. Structural 1, B-B or better; mill oiled and edge sealed.
d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.


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

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

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

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


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

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


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

1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, leave holes no larger than 1 inch 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, deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
C. Galvanized Reinforcing Bars: ASTM A 615/A 615M, Grade 60 ASTM A 706/A 706M, deformed bars, ASTM A 767/A 767M, Class I Class II zinc coated after fabrication and bending.

D. Epoxy-Coated Reinforcing Bars: ASTM A 615/A 615M, Grade 60 ASTM A 706/A 706M, deformed bars, ASTM A 775/A 775M or ASTM A 934/A 934M, epoxy coated, with less than 2 percent damaged coating in each 12-inch bar length.

E. Plain-Steel Wire: ASTM A 1064/A 1064M, as drawn.

F. Deformed-Steel Wire: ASTM A 1064/A 1064M.

G. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, 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, plain-steel bars, cut true to length with ends square and free of burrs.

B. Epoxy-Coated Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, ASTM A 775/A 775M epoxy coated.

C. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M.

D. Zinc Repair Material: ASTM A 780/A 780M.

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

1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.
4. For slabs on ground, use supports with sand plates or horizontal runners where base material will not support chair legs.
2.5 CONCRETE MATERIALS

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

B. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, Type I Type II Type I/II Type III Type V, gray white.
2. Fly Ash: ASTM C 618, Class F or C.
3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.
4. Blended Hydraulic Cement: ASTM C 595/C 595M, Type IS, portland blast-furnace slag Type IP, portland-pozzolan Type IL, portland-limestone Type IT, ternary blended cement.

C. Normal-Weight Aggregates: ASTM C 33/C 33M, Class 4S coarse aggregate or better, graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: [1-1/2 inches] [1 inch] [3/4 inch] nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Air-Entraining Admixture: ASTM C 260/C 260M.

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

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

F. 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.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. BASF Corp. - Construction Chemicals; MasterLife CI 30 (Pre-2014: Rheocrete CNI).
   b. Euclid Chemical Company (The); an RPM company; [EUCON BCN][EUCON CIA].
   c. GCP Applied Technologies Inc. (formerly Grace Construction Products); DCI.
   d. Sika Corporation; Sika CNI.
G. 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.

1. **Products:** Subject to compliance with requirements, provide one of the following:
   a. BASF Corp. - Construction Chemicals; MasterLife CI 222 (Pre-2014: Rheocrete 222+).
   b. GCP Applied Technologies Inc. (formerly Grace Construction Products); DCI-S.
   c. Sika Corporation; FerroGard 901.


2.6 VAPOR RETARDERS

A. Sheet Vapor Retarder: ASTM E 1745, Class A 15 mils. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. **Products:** Subject to compliance with requirements, provide one of the following:
   a. Raven Industries, Inc; Vapor Block 15.
   b. Stego Industries, LLC; Stego Wrap Vapor Barrier (15-Mil).
   c. W.R. Meadows, Inc; Perminator 15 mil.

B. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils thick.

2.7 LIQUID FLOOR TREATMENTS

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

1. **Products:** Subject to compliance with requirements, provide one of the following:
   a. BASF Corp. - Construction Chemicals; [MasterKure HD 200 WB (Pre-2014: Kure-N-Harden)] [MasterKure HD 300 WB (Pre-2014: Lapidolith)].
   b. ChemMasters, Inc; Chemisil Plus.
   c. Dayton Superior; [Pentra-Hard Densifier] [Pentra-Hard Finish] [Pentra-Hard Guard] [Sure Hard Densifier J17].
   d. Euclid Chemical Company (The); an RPM company; [Euco Diamond Hard] [Eucosil].
   e. SpecChem, LLC; SpecHard.
   f. W.R. Meadows, Inc; [INTRAGUARD] [LIQUI-HARD].

2.8 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
1. **Products:** Subject to compliance with requirements, provide one of the following:

   a. BASF Corp. - Construction Chemicals; Confilm.
   b. ChemMasters, Inc; Spray-Film.
   c. Dayton Superior; [AquaFilm Concentrate J74] [AquaFilm J74RTU].
   d. Euclid Chemical Company (The); an RPM company; Eucobar.
   e. Sika Corporation; [Caltexol CIMFILM] [SikaFilm].
   f. SpecChem, LLC; Spec Film.
   g. W.R. Meadows, Inc; EVAPRE.

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

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

D. Water: Potable.

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

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

      a. BASF Corp. - Construction Chemicals; [MasterKure CC 160 WB (Pre-2014: Kure N Seal WB)] [MasterKure CC 180 WB (Pre-2014: Kure N Seal VOC)] [MasterKure CC 200 WB (Pre-2014: Kure N Seal W)].
      b. ChemMasters, Inc; Safe-Cure Clear DR.
      c. Dayton Superior; [Clear Cure VOC J7WB] [Clear Resin Cure J11W].
      d. Euclid Chemical Company (The); an RPM company; [Aqua-Cure VOX] [Diamond Clear VOX] [Kurez DR VOX].
      e. SpecChem, LLC; [PaveCure Rez] [SpecRez].
      f. W.R. Meadows, Inc; 1100-CLEAR SERIES.

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

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

      b. ChemMasters, Inc; Safe-Cure & Seal 309.
      c. Dayton Superior; Cure & Seal 309 J18.
      d. Euclid Chemical Company (The); an RPM company; [Aqua Cure VOX] [Euco Diamond Hard].
      e. SpecChem, LLC; [Cure & Seal WB] [Cure & Seal WB 25].
G. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 18 to 25 percent solids, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

1. **Products**: Subject to compliance with requirements, provide one of the following:
   a. BASF Corp. - Construction Chemicals; [MasterKure CC 180 WB (Pre-2014: Kure-N-Seal)] [MasterKure CC 200 WB (Pre-2014: Kure-N-Seal W)].
   b. ChemMasters, Inc; Polyseal WB.
   c. Dayton Superior; Cure & Seal 1315 J22 WB.
   d. Euclid Chemical Company (The); an RPM company; [Diamond Clear VOX] [EverClear VOX] [Super Aqua-Cure VOX].
   e. SpecChem, LLC; Cure & Seal WB 25.

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

1. **Products**: Subject to compliance with requirements, provide one of the following:
   b. ChemMasters, Inc; Spray-Cure & Seal 25.
   c. Dayton Superior; Cure & Seal 25% J22UV.
   d. Euclid Chemical Company (The); an RPM company; [EverClear] [EverClear 350] [LusterSeal 300] [Super Diamond Clear].
   e. SpecChem, LLC; Cure & Seal 25.

2. <Double click to insert sustainable design text for floor treatment products.>

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

1. **Products**: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
   a. ChemMasters, Inc; Polyseal WB.
   b. Dayton Superior; [Cure & Seal 1315 EF] [Cure & Seal 1315 J22WB].
   c. Euclid Chemical Company (The); an RPM company; Super Diamond Clear VOX.
   d. SpecChem, LLC; Cure & Seal WB 25.
   e. W.R. Meadows, Inc; Vocomp-30.

2. <Double click to insert sustainable design text for floor treatment products.>
2.9 RELATED MATERIALS


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

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

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
   1. Types I and II, nonload bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

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

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

2.10 GEOFOAM

A. Manufacturers/Suppliers:
   1. ACH Foam Technologies, LLC, 809 East 15th Street, Washington, IA 52353
   2. Mid-Atlantic Foam, Inc., 326 McGhee Road, Winchester, VA 22603
   3. Thermal Foams, Inc., 2101 Kenmore Avenue, Buffalo, NY 14207

B. Properties:
   1. Foam-Control EPS Geofoam in compliance with ASTM D6817.
   2. Foam-Control EPS Geofoam: Type [EPS12] [EPS15] [EPS19] [EPS22] [EPS29] [EPS39] [EPS46].
   3. All Foam-Control EPS Geofoam blocks shall be treated by the manufacturer with a tested and proven termite treatment for below grade applications, 3 year minimum field exposure. The treatment shall be EPA registered, meet requirements of ICC ES AC239, and be recognized in an ICC ES report.

C. GeoGripper® Plates shall be used to restrain EPS Geofoam from moving laterally in layer over layer applications. The GeoGripper plate shall be manufactured by AFM Corporation. The plate shall be made of galvanized or stainless steel with two-sided multi-barbed design capable of piercing geofoam. Each plate shall be capable of a lateral holding strength of 60 lbs.
1. Minimum two plates for each 4’ x 8’ section of EPS block to minimize block to block movement during installation.

2.11 REPAIR MATERIALS

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

2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than [4100 psi] <Insert strength> at 28 days when tested according to ASTM C 109/C 109M.

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

2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than [5000 psi] <Insert strength> at 28 days when tested according to ASTM C 109/C 109M.

2.12 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. Fly Ash: 25 percent.
4. Combined Fly Ash or Pozzolan and Slag Cement: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
5. Silica Fume: 10 percent.
6. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
7. Combined Fly Ash or Pozzolans, Slag Cement, and Silica Fume: 50 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.
   1. Use water-reducing high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
   2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
   3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c 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.

2.13 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mixture as follows:
   1. Minimum Compressive Strength: 4000 psi at 28 days.
   2. Maximum Water-Cementitious Materials Ratio: 0.50.
   3. Slump Limit: 4 inches plus or minus 1 inch.

B. Walls, Columns and Interior Structural Frame: Proportion normal-weight concrete mixture as follows:
   1. Minimum Compressive Strength: 5000 psi at 28 days.
   3. Maximum Water-Cementitious Materials Ratio: 0.45.
   4. Slump Limit: 4 inches 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture plus or minus 1 inch.

C. Exterior and other concrete exposed to weather: Proportion normal-weight concrete mix as follows:
   1. Minimum Compressive Strength: 5000 psi-air-entrained.
   4. Slump Limit: 4 inches 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture plus or minus 1 inch.
5. Air Content: 5.5 percent, plus 1 or minus 1.5 percent at point of delivery for 1-1/2-inch (38-mm) nominal maximum aggregate size.
6. Air Content: 6 percent, plus 1 or minus 1.5 percent at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.

D. Interior Slabs-on-Grade and Slabs-on-Metal Deck: Proportion normal-weight concrete mix as follows:
   1. Minimum Compressive Strength: 4000 psi
   3. Maximum Water-Cementitious Materials Ratio: 0.42.
   4. Slump Limit: 4 inches 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture plus or minus 1 inch.

E. Lightweight Concrete: Proportion concrete mix as follows:
   1. Minimum Compressive Strength: 3500 psi
   3. Maximum Water-Cementitious Materials Ratio: 0.42.
   4. Maximum Equilibrium Unit Weight: 110 pounds per cubic foot.
   5. Slump Limit: 4 inches 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture plus or minus 1 inch.

2.14 FABRICATING REINFORCEMENT

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

2.15 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, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, 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. 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., increase mixing time by 15 seconds for each additional 1 cu. yd..
   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.
SECTION 04 0120 – MAINTENANCE OF UNIT MASONRY

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes restoration and cleaning of existing exterior masonry assemblies as follows:
   1. Pointing and repair of mortar joints, select areas as indicated or otherwise directed.
   2. Sealing of exposed cracks and holes.
   3. Cleaning exposed clay masonry surfaces.
   4. Removal and replacement of damaged existing clay masonry units.

PART 2 - PRODUCTS

2.01 MASONRY MATERIALS

A. Salvaged Face Brick: Provide salvaged brick from selective demolition and cutting operations. Clean off residual mortar. Grind or sawcut shapes where necessary to complete infill and patching work.

B. New Face Brick: As specified in Section 04 2000 and indicated on Drawings

2.02 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II.

B. Hydrated Lime: ASTM C 207, Type S.

C. Mortar Sand: ASTM C 144, unless otherwise indicated.
   1. Color: Provide natural sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color to match existing mortar color.
   2. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands, if necessary, to achieve suitable match.

D. Mortar Pigments: Natural and synthetic iron oxides, compounded for mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars, if required to match existing mortar color.

E. Water: Potable.

2.03 CLEANING MATERIALS

A. Water for Cleaning: Potable.

B. Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups of tetrasodium polyphosphate (TSPP), 1/2 cup of laundry detergent, and 20 quarts of hot water for every 5 gal. of solution required.
C. Job-Mixed Mold, Mildew, and Algae Remover: Solution prepared by mixing 2 cups of tetrasodium polyphosphate (TSPP), 5 quarts of 5 percent sodium hypochlorite (bleach), and 15 quarts of hot water for every 5 gal. of solution required.

D. Mild Acidic Cleaner for Limestone: Manufacturer's standard mildly acidic cleaner containing no hydrochloric, hydrofluoric, or sulfuric acid; or chlorine bleaches.
   1. Dilute with water to concentration demonstrated by testing that does not etch or otherwise damage limestone surface, but not greater than that recommended by chemical cleaner manufacturer
   2. Products:
      a. Diedrich Technologies Inc.; Enviorestore 100.
      b. Dominion Restoration, Inc.; DR-60 Stone and Masonry Cleaner.
      c. Dumond Chemicals, Inc.; Safe n' Easy Heavy Duty Restoration Cleaner.
      d. ProSoCo; Sure Klean Light-Duty Restoration Cleaner.

E. Dilute chemical cleaners with water to produce solutions not exceeding concentration recommended by chemical cleaner manufacturer.

2.04 MISCELLANEOUS MATERIALS

A. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, and polished stone surfaces from damaging effects of acidic and alkaline masonry cleaners.
   1. Available Products:
      b. Diedrich Technologies Inc.; Diedrich Acid Guard.
      c. Price Research, Ltd.; Price Mask.
      d. ProSoCo; Sure Klean Strippable Masking.

B. Sealant Materials:
   1. Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer and characteristics indicated below that comply with applicable requirements in Division 07 Section "Joint Sealants."
      a. Single-component, nonsag urethane sealant
   2. Colors: Provide colors of exposed sealants to match colors of masonry adjoining installed sealant unless otherwise indicated.
   3. Ground-Mortar Aggregate: Custom crushed and ground pointing mortar sand or existing mortar retrieved from joints. Grind to a particle size that matches the adjacent mortar aggregate and color. Remove all fines passing the 100 sieve.
   4. Joint-Sealant Backing: Cylindrical sealant backings and bond breaker tape applicable to conditions, as recommended by manufacturer, and complying with applicable requirements of Division 07 Section “Joint Sealants.”
2.05 MORTAR MIXES

A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.
1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.

B. Colored Mortar: Produce mortar of color to match existing mortar by using selected ingredients. Do not alter specified proportions without Architect's approval.
1. Mortar Pigments: Where mortar pigments are indicated, do not exceed a pigment-to-cement ratio of 1:10 by weight.

C. Do not use admixtures of any kind in mortar, unless otherwise indicated.

D. Mortar Proportions: Mix mortar materials in the following proportions:
1. Pointing Mortar for Brick: 1 part portland cement, 2 parts lime, and 6 parts sand.
2. If required, add mortar pigments to produce mortar colors required.

END OF SECTION 04 0120
SECTION 04 2000 - UNIT MASONRY

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes unit masonry assemblies consisting of the following:
   1. Concrete masonry units (CMUs).
   2. Face brick.
   3. Cast stone sills and trim.
   4. Natural stone panels and trim.
   5. Mortar and grout
   6. Reinforcing steel.
   7. Masonry joint reinforcement.
   8. Ties and anchors.
   9. Embedded flashing.
   10. Miscellaneous masonry accessories.
   11. Cavity-wall insulation installed as part of multi-wythe masonry cavity wall construction.
   12. Expansion joint elastomeric expansion gasket and seal.

B. Related Sections include the following:
   1. Division 03 Section “Cast-In-Place Concrete” for foundation support of masonry units.
   2. Division 04 Section “Maintenance of Unit Masonry” for cleaning, repair, and modification of existing exterior masonry, and salvaging of existing brick for reuse on Project.
   3. Division 05 Section “Structural Metal Stud (Cold-Rolled) Framing” for steel-framed masonry backup assemblies and wall sheathing.
   4. Division 07 Section "Thermal Insulation" for cavity wall insulation installed as part of studwall backup assemblies.
   5. Division 07 Section "Air Barriers" for continuity of air barrier system.
   6. Division 07 Section "Joint Sealants" for sealing control and expansion joints in unit masonry.

C. Products installed, but not furnished, under this Section include the following:
   1. Steel lintels and shelf angles for unit masonry, furnished under Division 05 Section "Metal Fabrications."
   2. Cavity wall insulation, furnished under Division 07 Section “Thermal Insulation”
   3. Manufactured reglets in masonry joints for metal flashing, furnished under Division 07 Section "Roof Specialties"

PART 2 - PRODUCTS

2.01 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not uses units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.
B. Salvaged Face Brick: Retain salvaged brick from selective demolition and cutting operations for use in infill and patching of existing masonry. Clean off residual mortar. Grind or sawcut shapes where necessary to complete infill and patching Work. Refer also to requirements of Section 04 0120.

C. Approval of masonry veneer products: Sample Panels in conformance with Section 01 6000 and as follows:
   1. Prior to Bidding: Prior to 8 working days prior to date scheduled for opening of bids, bidder to meet at site with Architect and Construction Manager, by prior appointment, to present samples showing blends, textures and range available, including proposed range of proposed mortar blends, demonstrating capability of product to satisfy the design intent.
      a. Submit formal request to schedule site meeting no later than 3 calendar days prior to requested meeting time.
      b. Include formal request for product approval, with appropriate documentation required by Section 01 6600.
      c. Acceptance of products will be by Addendum to Bidding Documents.
   2. After award of Contract: Requests for substitution will be decided subject to Architect's review of additional representative mock-up incorporating proposed substitute products, constructed in accordance to requirements for Sample Panels in Part 1 “Quality Assurance” Article above.
      a. Comply with requirements of Combined Contractors' Construction Schedule, allowing time for Architect's action on substitution request, and lead time for suppliers' production and delivery. No extension of time will be granted.
      b. Required sample panels shall include brick blends and range with mortar to match the face brick construction at the existing High School. Sample panels shall be constructed at the site for comparison to the existing brick.
      c. Upon approval by Architect and Construction Manager, for cold-weather construction, sample panels may be constructed off-site and delivered to Project site for review.
      d. Owner reserves the right to require, or to waive, a Change Order reducing the Contract Sum, or Contract Time, or both, in conformance with Section 01 6000.

2.02 CONCRETE MASONRY UNITS (CMUs)

A. Shapes: Provide shapes as indicated on the drawings and as follows:
   1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
   2. Provide C.M.U. bullnose units for exposed outside corners, jambs and sills, unless otherwise indicated.
      a. Where CMU construction is concealed behind interior finishes (gypsum, ceramic tile, applied stool or casing, etc.), do not use bullnose corners.

B. Concrete Masonry Units: ASTM C 90 and as follows:
   1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength as indicated in structural notes on S000.
   2. Weight Classification: normal weight.
   3. Size: Manufactured to dimensions 3/8 inch less than nominal dimensions.
   4. Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.

C. Decorative CMUs: ASTM C 90 Type 1 moisture controlled Split-Face and Matt Face Concrete Masonry Units.
1. Provide units with minimum face shell thickness of 2 inches, and minimum average net-area compressive strength of matching standard gray units.

2. Density Classification: Normal weight, minimum density 110 lbs per cu ft.

3. Manufacture units with Dry Block water-repellent admixture in proportion recommend by manufacturer.

4. Size: As indicated in Drawings.
   a. Provide special shapes as detailed or otherwise required for conditions shown. Include the following:
      1) Window Sills
      2) Corner, end and jamb units
      3) Other shapes as recommended by Manufacturer and approved by Architect.

5. Color: Provide units made with integrally colored concrete matrix and special aggregate matching approved sample.

D. Concrete Building Brick: ASTM C 55 and as follows:
   1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3500 psi.
   2. Weight Classification: normal weight.
   3. Size: Manufactured to dimensions 3/8 inch less than nominal dimensions.
   4. Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.

2.03 BRICK

A. General: Provide shapes as indicated on the Drawings and as follows:
   1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
   2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, relief/shelf angles, and lintels.
   3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
   4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Face Brick: ASTM C 216, Grade SW, Type FBS.
   1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 4400 psi.
   2. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
   3. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
4. Surface Coating: Brick with colors or textures produced by application of coatings shall withstand 50 cycles of freezing and thawing per ASTM C 67 with no observable difference in the applied finish when viewed from 10 feet.

5. Application: Use where brick is exposed, unless otherwise indicated.

6. Face Brick: Basis of Design, size, texture and finish:
   a. Match face brick currently used at the existing South Fayette High School. The custom blend shall be presented in sample panels and final approval shall be by the Owner and Architect.
   b. Acceptable Manufacturer: Basis of Design manufacturer texture and color as scheduled on Drawings,
   c. Typical Size: Nom. 4x4x8 (Jumbo Closure/Economy) units
   d. Substitution: in conformance with Section 01 6000 and as specified herein.

2.04 GRANITE

A. Granite: ASTM C 615 Fine-grained stone of approved color. Uniform pattern, without veining. Comply with recommendations for sizes, shapes, and tolerances in NBGQA's "Specifications for Architectural Granite" for faces, edges, beds, and backs
   1. Match Architect's samples for color, finish, and other stone characteristics relating to aesthetic effects.
   2. Provide stone units accurately shaped, with exposed faces dressed true, and with beds and joints at right angles to faces.
   3. Dress joints (bed and vertical) straight and at right angle to face, unless otherwise indicated. Shape beds to fit supports.
   4. Where edge of stone is visible in the finished work, make items uniform in thickness and of identical thickness for each type of item; gage back of stone if necessary.
   5. Provide openings, reveals, and similar features as needed to accommodate adjacent work.
   6. Clean backs of stone to remove rust stains, iron particles, and stone dust.

B. Match approved samples and mockups for color, finish, and other stone characteristics relating to aesthetic effects. Finish exposed faces and edges of stone to comply with requirements indicated.
   2. Variety and Source: Subject to compliance with requirements, provide scheduled product.

C. Select stone for intended use to prevent fabricated units from containing cracks, seams, and starts that could impair structural integrity or function.
   1. Repairs that are characteristic of the varieties specified are acceptable provided they do not impair structural integrity or function and are not aesthetically unpleasing, as judged by Architect.

D. Inspect finished stone units at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units.
   1. Grade and mark stone for overall uniform appearance when assembled in place. Natural variations in appearance are acceptable if installed stone units match range of colors and other appearance characteristics represented in approved samples and mockups.
2.05 CAST STONE UNITS

A. Acceptable manufacturers, subject to compliance with specified requirements:
   1. RockCast, Division of Reading Rock, Inc; www.rockcast.com
   2. Arriscraft International; www.arriscraft.com
   3. Custom Cast Stone, Inc, 888.776.9960
   5. Marc Stone LLC, 651-437-7972; www.marcstone.com

   2. Profiles: As indicated on Architectural Drawings and approved by Architect. If available standard shapes are not satisfactory, provide custom shape as indicated on drawings.
   3. Sizes: Height, pitch, and depth as indicated in single length as required for each location indicated.
   4. Texture and Color: Smooth fine-grained texture and color as selected by Architect from manufacturer’s full range of standard colors. Submit available colors to Architect for final selection.

C. Materials:
   1. Portland Cement: ASTM C 150, Type I or III, containing not more than 0.60 percent total alkali when tested according to ASTM C 114.
   2. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C 33; gradation as needed to produce required textures and colors as needed to produce required cast stone colors.
   3. Fine Aggregates: Natural sand or crushed stone complying with ASTM C 33, gradation as needed to produce required textures and colors as needed to produce required cast stone colors.
   4. 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.
   5. Admixtures: Do not use admixtures unless specified or approved in writing by Architect.
   6. Reinforcement: Deformed steel bars complying with ASTM A 615/A 615M. Use galvanized reinforcement when covered with less than 1-1/2 inches of cast stone material.
      a. Galvanized Coating: ASTM A 767/A 767M.
   7. Embedded Anchors and Other Inserts: Fabricated from stainless steel complying with ASTM A 240, ASTM A 276, or ASTM A 666, Type 304.

D. Cast Stone Profiles: As indicated on Drawings, or as otherwise needed to satisfy the requirements of the masonry wall construction. Observe the Cast Stone Institute Value Engineering suggestions as appropriate.
   1. Fabricated types and shapes shown or otherwise necessary, whether or not specifically identified, to complete the work.
   2. Follow jointing pattern where shown.
   3. Fabricate units to suit in-place wall dimensions. Minimize field cutting.
   4. Provide units with finished face on exposed surfaces. Do not expose sawn edges.
5. Provide sill units in longest practicable lengths, sized to fit the masonry opening without vertical joints, or minimizing vertical joints spaced evenly along the length of the sill. Allow for head joint or control joint thicknesses. Where masonry mullions divide window units over a continuous sill, locate head joints at masonry mullions.

6. Band Courses: Provide units in even modular lengths, minimum nominal 60-inch or as otherwise approved. Lay out courses with adjacent vertical joints randomly staggered 15 to 30 inches, unless approved otherwise. Maintain control and expansion joint locations.

7. Provide coping in even modular lengths, minimum nominal 48-inch module or as otherwise approved. In any case, limit length to 15 times the cross sectional thickness.

8. In addition to profiles shown, provide shapes to accommodate inside and outside corners, returns, and unusual conditions.

9. Coping corners may be mitered or fabricated as corner returns, at fabricator's discretion.

E. Accessories:

1. Embedded Anchors and Other Inserts: Type and size indicated or recommended by manufacturer for specific application, fabricated from stainless steel complying with ASTM A 240, ASTM A 276, or ASTM A 666, Type 304.

2. Dowels: Round stainless-steel bars complying with ASTM A 276, Type 304, and 1/2-inch diameter.

3. Acidic Cleaner: Manufacturer's standard-strength, general-purpose cleaner designed for removing mortar/grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces; expressly approved for intended use by cast stone manufacturer and expressly approved by cleaner manufacturer for use on cast stone and adjacent masonry materials.
   a. Diedrich Technologies, Inc.
   b. EACo Chem, Inc.
   c. ProSoCo, Inc.

F. Fabricate pre-cast units resistant to freezing and thawing as determined by laboratory testing according to ASTM C 666, Procedure A, as modified by ASTM C 1364, and are made from cast stone that has a history of successful resistance to freezing and thawing.

G. Fabricate units with sharp arris and details accurately reproduced with indicated texture on all exposed surfaces, unless otherwise indicated.

1. Slope exposed horizontal surfaces 1:12 min to direct water away from face of wall or toward roof side of parapet.

2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.

3. Provide drips on projecting elements, whether or not shown.

H. Fabrication Tolerances:

1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch.

2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch, whichever is greater, but in no case by more than 1/4 inch.

3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch, whichever is greater.

4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch on formed surfaces of units and 3/8 inch on unformed surfaces.
I. Acid etch units after curing to remove cement film from surfaces to be exposed to view.

2.06 STONE ACCESSORIES

A. Provide installation accessories as recommended by manufacturer for specific application.

B. Setting Shims: Strips of resilient plastic or vulcanized neoprene, Type A Shore durometer hardness of 50 to 70, nonstaining to stone, of thickness needed to prevent point loading of stone on anchors and of depths to suit anchors without intruding into required depths of pointing materials.
   1. Application: Stone supported on shelf angles

C. Setting Buttons: Resilient plastic buttons, nonstaining to stone, sized to suit joint thicknesses and bed depths of stone units without intruding into required depths of pointing materials.
   1. Application: Stone supported set on mortar bed, supported by masonry below.

D. Sealants for Joints in Stone Masonry: Manufacturer’s standard chemically curing, elastomeric sealants of base polymer and characteristics indicated below that comply with applicable requirements in Division 07 Section “Joint Sealants” and do not stain stone.
   1. Single-component, nonsag, urethane sealant; Class 25, Use M (masonry).
      b. Sonneborn, Division of ChemRex; NP 1.
      c. Sonneborn, Division of ChemRex; Ultra.
      d. Tremco, Sealant/Waterproofing Division; Vulkem 116.
   2. Colors: Provide color as selected by Architect from manufacturer’s full range.

E. Cleaner: Stone cleaner specifically formulated for stone types, finishes, and applications indicated, as recommended by stone producer. Do not use cleaning compounds containing acids, caustics, harsh fillers, or abrasives.

2.07 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction.
   1. Portland Cement For Mortar Used With Pre-Cast Stone: ASTM C 150, Type I or III, containing not more than 0.60 percent total alkali when tested according to ASTM C 114.

B. Mortar Colors (if used):
   1. Infill and patch brickwork in existing construction, using salvaged brick:
      a. Provide custom blend of mortar color and aggregate to match existing mortar color and texture, subject to Architect’s approval. Use only pigments with a record of satisfactory performance in masonry mortars in matching existing in-place mortar.
   2. New construction: Provide colors for each veneer masonry type as selected by Architect from approved Manufacturer’s full range of at least 30 colors.
   3. Pigmented Mortar (if used): Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
   4. Colored-Aggregate Mortar (if used): Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.

C. Hydrated Lime: ASTM C 207, Type S.
D. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207, Type S.

E. Aggregate for Mortar: ASTM C 144.
1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

F. Aggregate for Grout: ASTM C 404.

G. Water: Potable.

H. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
1. Euclid Chemical Company (The); Accelguard 80.
3. Sonneborn, Div. of ChemRex; Trimix-NCA.

I. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with face brick or for exterior concrete form masonry units, containing integral water repellent by same manufacturer.
1. Addiment Incorporated; Mortar Tite.
2. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Dry-Block Mortar Admixture.
3. Master Builders, Inc.; Color Cure Mortar Admix or Rheomix Rheopel.

2.08 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
1. Use water-repellant admixture as recommended by grout manufacturer.
2. Do not use calcium chloride in mortar or grout.
3. Limit cementitious materials in mortar to portland cement and lime.
4. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
1. For masonry below grade or in contact with earth, use Type S or M.
2. For reinforced masonry, use Type S or M.
3. For mortar parge coats, use Type S.
4. For exterior, above-grade, load-bearing walls and parapet walls; for interior load-bearing walls; and for other applications where another type is not indicated, use Type S.
5. For non-load-bearing masonry and veneers, use Type N.

D. Grout for Unit Masonry: Comply with ASTM C 476 – 3,000 psi min.  
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.19.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.
3. For reinforced masonry, use Type S.
4. For mortar parge coats, use Type S.
5. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; and for other applications where another type is not indicated, use Type S.
6. For interior non-load-bearing partitions, use Type N.
7. Provide grout with compressive strength to develop specified design f'm, but not less than 2000 psi. Determine strength per ASTM C 1019.
8. High lift grouting: Conform to masonry wall construction outlined in NCMA TEK 3-2A. Grout should be 1/2 inch maximum size large aggregate conforming to ASTM C 476 and NCMA TEK 9-4A.

E. Pigmented Mortar (if used): Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

F. Colored-Aggregate Mortar (if used): Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.

G. Epoxy Pointing Mortar: Mix epoxy pointing mortar to comply with mortar manufacturer's written instructions.

2.09 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M.

B. Masonry Joint Reinforcement, General: ASTM A 951. 
1. Interior Walls: Mill-galvanized, carbon steel.
2. Exterior Walls: Hot-dip galvanized, carbon steel.
3. Wire Size for Side Rods and Cross Rods: W1.7 or 0.148-inch diameter.
4. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
5. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods. 
1. Use ladder-type in masonry construction with vertical steel reinforcing.

D. Masonry Joint Reinforcement for Multiwythe Masonry: Adjustable (two-piece) type, ladder design, with one side rod at each face shell of backing wythe and with separate ties that extend into facing wythe. Ties have two hooks that engage eyes or slots in reinforcement and resist movement perpendicular to wall. Ties extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face.
E. 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 0.142-inch steel wire, hot-dip galvanized after fabrication. Units are formed from 0.142-inch steel wire. Provide units with either two loops or four loops as needed for number of bars indicated.

F. Masonry Joint Reinforcement for Veneers Anchored with Seismic Masonry-Veneer Anchors: Single 0.187-inch-diameter, hot-dip galvanized, carbon-steel continuous wire.

2.10 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with eight subparagraphs below, unless otherwise indicated.
   1. Mill-Galvanized, Carbon-Steel Wire: For interior walls only, ASTM A 82; with ASTM A 641, Class 1 coating.

B. Wire Ties, General: Unless otherwise indicated, use round wire and size ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.

C. Adjustable Masonry Anchors for Connecting to Steel Frame: Provide two-piece assemblies that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
   1. Anchor Section: Crimped 1/4-inch-diameter, hot-dip galvanized steel wire anchor section for welding to steel. Mill galvanized wire may be used at interior walls where humidity does not exceed 75 percent.
   2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.1875-inch-diameter, hot-dip galvanized steel wire. Mill galvanized wire may be used at interior walls where humidity does not exceed 75 percent.
      a. For steel frame in plane of wall, use 9-in trapezoid wire web ties, similar to Heckmann #318.

D. Adjustable Masonry-Veneer Anchors: Comply with ACI 530.1/ASCE 6/TMS 602
   1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to metal studs, and as follows:
      a. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.
      b. Provide required embedment in mortar. Where clear span between inside face of brick veneer and screw-attached anchor exceeds
      c. Fabricate sheet metal anchor sections and other sheet metal parts from 0.097-inch-thick, steel sheet, galvanized after fabrication.
      d. Wire Ties: Triangular-, rectangular-, or Trapezoid-shaped wire ties fabricated from 0.25-inch-diameter, hot-dip galvanized steel wire.
2. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section, hot dip galvanized after fabrication in accordance with ASTM A 153/A Class B-2
   a. Contractor's Option: Unless otherwise indicated and subject to Architect’s approval, provide any of the following types of anchors, as applicable to conditions:
   b. Plate and Pintle Anchor Section: Sheet metal plate, 12 gage with screw holes top and bottom designed to accommodate rigid cavity insulation in thickness specified, with a slot at cavity end of plate for inserting wire pintle tie. Provide Double Pintle Wire Ties in length required for specified mortar embedment
      1) Dur-O-Wal "DA 213"
      2) Hohmann & Barnard "HB 200"
      3) Wire-Bond "HCL 711"
      4) BLOK-LOK Limited; BL-407 and Wedge-Lok.

   c. Barrel-Screw Anchor Section: Zinc-alloy barrel section with flanged head with eye and corrosion-resistant, self-drilling screw. Eye designed to receive wire tie and to serve as head for drilling fastener into framing. Barrel length to suit sheathing thickness, allowing screw to seat directly against framing with flanged head covering hole in sheathing and air barrier. Provide triangular wire tie.
      1) Hohmann & Barnard "2-Seal Tie"
      2) Heckmann Building Products; Pos-I-Tie or Wing Nut Pos-I-Tie.

3. Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene washer, No. 10 diameter by length required to penetrate steel stud flange with not less than 3 exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours per ASTM B 117.
   1) ITW Buildex; Teks Maxisecal with Climaseal finish.
   2) Textron Inc., Textron Fastening Systems; Elco Dril-Flex with Stalgard finish.

4. Seismic Masonry-Veneer Anchors: Units consisting of a metal anchor section and a connector section designed to engage a continuous wire embedded in the veneer mortar joint.
   a. Application: Stone face veneers.

E. Partition Top anchors: 0.097-inch thick metal plate with 3/8-inch diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

F. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins, unless otherwise indicated.
   1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.

G. Stone Anchors: Fabricate dowels, clips, cramps, and other stone anchors from stainless steel.

H. Anchor Bolts: Headed steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.
I. Postinstalled Anchors: Provide chemical or torque-controlled expansion anchors, with capability to sustain, without failure, a load equal to six times the load imposed when installed in solid or grouted unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

1. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 for bolts and nuts; ASTM A 666 or ASTM A 276, Type 304 or 316, for anchors.

2.11 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:

1. Zinc-Tin Alloy-Coated Stainless-Steel Sheet: ASTM A 240, Type 304, 0.016 inch thick, dead-soft, fully annealed stainless-steel sheet of minimum uncoated thickness indicated; coated on both sides with a zinc-tin alloy (50 percent zinc, 50 percent tin), with factory-applied gray preweathering.
   a. Follansbee Steel; TCS II.

2. Metal Drip Edges: Fabricate from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed. Provide these drip edges with the use of both Flexible Flashing options listed below.

3. Metal Flashing Terminations: Fabricate from stainless steel. Extend at least 3 inches into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch and down into joint 3/8 inch to form a stop for retaining sealant backer rod.

B. Flexible Flashing: For flashing not exposed to the exterior, use one of the following, unless otherwise indicated:

1. Copper-Laminated Flashing, non-asphaltic: 5-oz./sq. ft. copper sheet bonded between 2 layers of glass-fiber cloth or PE film. Use only where flashing is fully concealed in masonry and compatible with other components of cavity-wall assembly.
   a. Advanced Building Products Inc.; Copper SealTite 2000.
   c. Hohmann & Barnard, Inc; Copper-Fabric NA Flashing

2. Polymeric Reinforced Membrane Flashing: At Contractor’s option and in compliance with specified requirements, provide 40-mil preformed non-asphaltic composite flashing product consisting of a polyester-reinforced polymer alloy with non-asphaltic non-drooling adhesive back. Provide adhesive backing to edge where used with metal drip edge; provide adhesive held back 1 inch from edge where flashing extends to face of masonry.
   b. Hohmann & Barnard, Inc; Sandell Textroflash

3. Laminated Stainless Steel Fabric Flashing: At Contractor’s option and in compliance with specified requirements, provide composite membrane of Type 304 Stainless steel core with polymer fabric laminated to back face with non-asphalt adhesive.
   a. STS Coatings, Inc.; Gorilla Flash Stainless Fabric
   b. Illinois Products, Inc.; IPCO Stainless Steel Fabric Flashing
   c. TK Products, Inc.; TK TWFYork Manufacturing, Inc.; Multi-Flash SS.
   d. Hohmann & Barnard, Inc; Mighty-Flash

4. Provide compatible installation accessories provided or approved by manufacturer.
   a. Provide compatible preformed corners, end dams, other special shapes, and seaming materials produced or otherwise recommended by flashing manufacturer.
C. Except as otherwise allowed, provide prefabricated inside and outside corner shapes, steps and elevation changes, end dams, and other special conditions required to maintain continuity in water barrier, in both metal flashing and flexible flashing. Site forming and fabrication of flashing will be acceptable only with prior written permission.
   1. Submit detailed shop drawings indicating location and configuration of special flashing condition, whether shop-fabricated or field-formed.

D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.12 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene or urethane.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Thermal Break/ Bearing Pads: 1/2-inch 90-durometer continuous neoprene strips for installation between steel bearing member (girder, beam, shelf, relief angle) and masonry veneer wythe, where steel is exposed to indoor exposure and masonry wythe has outdoor exposure.

D. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

E. Weep/Vent Products: Use the following, unless otherwise indicated:
   1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.
      a. Advanced Building Products Inc.; Mortar Maze weep vent.
      b. Dayton Superior Corporation, Dur-O-Wal Division; Cell Vents.
      c. Heckmann Building Products Inc.; No. 85 Cell Vent.
      d. Hohmann & Barnard, Inc.; Quadro-Vent.
      e. Wire-Bond; Cell Vent.
   2. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch less than depth of outer wythe; in color selected by Architect from manufacturer's standard.
      a. Archovations; CalClear Weep Vents.
      b. Mortar Net USA, Ltd.; Mortar Net Weep Vents.
      c. Sandell Manufacturing Co., Inc.;
F. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity. Use manufacturer’s standard thickness, allowing no more than 3/8 inch gap between drainage material and exterior wythe. Provide one of the following configurations:
1. Strips, not less than 1-1/2 inches thick and 10 inches wide, with dimpled surface designed to catch mortar droppings and prevent weep holes from being clogged with mortar.
2. Sheets or strips full depth of cavity and installed to full height of cavity.
3. Products:
   a. Advanced Building Products Inc.; Mortar Break II.
   b. Dayton Superior Corporation, Dur-O-Wal Division; Polytite MortarStop.
   c. Mortar Net USA, Ltd.; Mortar Net.

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 0.142-inch steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated.
1. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
3. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
4. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

H. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

I. Sealant Materials: Provide chemically curing, elastomeric sealant of base polymer and characteristics indicated below that comply with applicable requirements in Division 07 Section "Joint Sealants."
1. Single-component, nonsag urethane sealant.
2. Colors: Provide colors of exposed sealants to match colors of stonework adjoining installed sealant unless otherwise indicated.

J. Joint-Sealant Backing:
1. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) or Type B (bicellular material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
2. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.13 CAVITY-WALL INSULATION

A. Coordinate all affected components of cavity-wall assemblies, as well as adjacent, abutting and penetrating construction, with selected insulation product. Include coordination and preinstallation meetings with other Prime Contractors, and review shop drawings of other affected Prime Contracts.
B. Basis-of-Design: Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, density 1.6 lb/cu.ft. minimum with compressive resistance 25 psi as per ASTM D 1621.
   1. Thermal Resistance: 5-year aged minimum R-value of 5.7 per inch.
      a. Thickness: 2 layers of 1.5-inch board, unless noted otherwise [check availability]
   2. Water Absorption: Maximum 0.1 percent by volume as per ASTM C 272.

C. Adhesive: Type recommended by insulation board manufacturer for application indicated, and compatible with air barrier membrane.

2.14 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
   1. Diedrich Technologies, Inc.
   2. EaCo Chem, Inc.
   3. ProSoCo, Inc.

END OF SECTION 04 2000
SECTION 05 4000 – STRUCTURAL COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Cold-Formed Light Gage Metal Framing (LGMF) for structural applications, including:
      a. Exterior non-load-bearing wall and miscellaneous framing.
      b. Curtain wall and masonry veneer backup framing.
   2. Design and Engineering requirements for load-resisting assemblies.
   3. Exterior wall sheathing.

B. Related Sections include the following:
   1. Division 04 Section "Unit Masonry" for stone and brick veneer construction.
   2. Division 07 Section "Air Barriers" for continuity of air barrier system.
   3. Division 07 Section "Thermal Insulation" for cavity wall rigid insulation.
   4. Division 09 Section "Gypsum Board Assemblies" for interior non-load-bearing, metal-stud framing, ceiling bulkhead and ceiling-suspension assemblies.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide cold-formed metal framing by a current member of Steel Stud Manufacturers Association (SSMA), or of the Steel Framing Industry Association (SFIA).
   1. Stud Wall and Masonry Backup Wall Assemblies:
      a. Basis of Design: ProSTUD by ClarkDietrich Building Systems
      b. Marino\WARE
      c. Telling Industries

2.02 MATERIALS

A. Steel Sheet: ASTM A 1003 and A 653, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
   1. Grade: As required by structural performance.
   2. Coating: G60 typical, G90 at masonry backup assemblies.

B. Steel Sheet for Vertical Deflection Clips: ASTM A 1003 and A 653, structural steel, zinc coated, of grade and coating as follows:
   1. Grade: As required by structural performance.
   2. Coating: G90.
SECTION 05 2100 - STEEL JOIST FRAMING

PART 1 - GENERAL

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

1.2 SUMMARY
A. Section Includes:
   2. KCS-type K-series steel joists.
   4. LH- and DLH-series long-span steel joists.
   5. Joist accessories.

PART 2 - PRODUCTS

2.1 MANUFACTURERS
A. <Double click here to find, evaluate, and insert list of manufacturers and products.>

2.2 PERFORMANCE REQUIREMENTS
A. Structural Performance: Provide special joists and connections capable of withstanding design loads indicated.
   1. Use [ASD; data are given at service-load level] [LRFD; data are given at factored-load level].
   2. Design special joists to withstand design loads with live-load deflections no greater than the following:
B. <Double click to insert sustainable design text for recycled content of steel products.>
2.3 K-SERIES STEEL JOISTS


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

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

C. Provide holes in chord members for connecting and securing other construction to joists. Reduce joist load-carrying capacity proportionately to reduction in chord area.

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

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

F. Do not camber joists.

G. Camber joists [according to SJI's "Specifications." ] [as indicated] <Insert camber requirements>. 

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.

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

2.4 LONG-SPAN STEEL JOISTS

A. Manufacture steel joists according to "Standard Specification 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:][ as indicated.]

1. Joist Type: [LH-series steel joists] [and] [DLH-series steel joists].
2. End Arrangement: [Underslung] [Square].
3. Top-Chord Arrangement: [Parallel] [Pitched 1/8 inch per 12 inches, one way] [Pitched 1/8 inch per 12 inches, two ways] <Insert pitch>.

B. Provide holes in chord members for connecting and securing other construction to joists. Reduce joist load-carrying capacity proportionately to reduction in chord area.

C. Camber long-span steel joists [according to SJI's "Specifications." ] [as indicated. ] <Insert camber requirements.>
D. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches.

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

2.5 PRIMERS

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

2.6 JOIST ACCESSORIES

A. Bridging: Unless noted otherwise, provide bridging anchors and number of rows of \( \text{[horizontal]} \) \[ or \] \( \text{[diagonal]} \) bridging of material, size, and type required by SJI's "Specifications" and "Standard Specification for Composite Steel Joists, CJ-Series" in "Standard Specifications for Composite Steel Joists, Weight Tables and Bridging Tables, Code of Standard Practice" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.

B. Steel bearing plates with integral anchorages are specified in Section 051200 "Structural Steel Framing"

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

1. Finish: \( \text{[Plain, uncoated]} \) \( \text{[Hot-dip zinc coating, ASTM A 153/A 153M, Class C]} \) \[ Mechnically deposited zinc coating, ASTM B 695, Class 50] \].

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

1. Finish: \( \text{[Plain]} \) \( \text{[Hot-dip zinc coating, ASTM A 153/A 153M, Class C]} \) \[ Mechnically deposited zinc coating, ASTM B 695, Class 50] \].

E. Welding Electrodes: Comply with AWS standards.

F. Galvanizing Repair Paint: \( \text{[MPI#18, MPI#19, or SSPC-Paint 20]} \) \[ ASTM A 780/A 780M] \].

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

2.7 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by \( \text{[hand-tool cleaning, SSPC-SP 2]} \) \[ or \] \( \text{[power-tool cleaning, SSPC-SP 3]} \).
B. Do not prime paint joists and accessories[to receive sprayed fire-resistive materials].

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

END OF SECTION 05 2100
SECTION 05 1200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Structural steel.
2. Prefabricated building columns.
3. Field-installed shear connectors.
5. Other Steel: shelf angles, relieving angles, loose lintels, beam lintels.
6. Steel joist bearing plates.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

1. Select and complete connections using schematic details indicated and AISC 360.
2. Use Allowable Stress Design; data are given at service-load level.
3. Unless noted otherwise on design drawings, design and provide stiffeners, doubler plates, etc., in connections where needed.

B. Engineering Responsibility: Fabricator's responsibilities include using a qualified professional engineer to prepare structural analysis data for structural-steel connections.

C. Moment Connections: Type FR, fully restrained.

2.2 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: [ASTM A 992/A 992M] [ASTM A 572/A 572M, Grade 50]

B. Channels, Angles[, M] [, S]-Shapes: [ASTM A 36/A 36M]
C. Plate and Bar: [ASTM A 36/A 36M] [ASTM A 572/A 572M, Grade 50]

D. Corrosion-Resisting Structural-Steel Shapes, Plates, and Bars: ASTM A 588/A 588M, Grade 50.

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

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

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

   1. Weight Class: As indicated.
   2. Finish: [Black] [Galvanized] [Black except where indicated to be galvanized].

H. Steel Castings: ASTM A 216/A 216M, Grade WCB with supplementary requirement S11.

I. Steel Forgings: ASTM A 668/A 668M.

J. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS, CONNECTORS, AND ANCHORS

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

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

B. High-Strength Bolts, Nuts, and Washers: ASTM A 490, Type 1, heavy-hex steel structural bolts[ or tension-control, bolt-nut-washer assemblies with splined ends]; ASTM A 563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers with plain finish.

   1. Direct-Tension Indicators: ASTM F 959, Type 490, compressible-washer type with plain finish.

C. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers.

   1. Finish: [Hot-dip zinc coating] [Mechanically deposited zinc coating] [Hot-dip or mechanically deposited zinc coating].
   2. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with [mechanically deposited zinc coating] [mechanically deposited zinc coating, baked epoxy-coated] finish.
D. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, [heavy-hex] [round] head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.

1. Finish: [Plain] [Mechanically deposited zinc coating].

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

F. Deformed Bar Anchors: ASTM A496 and AWS D1.1, from cold-rolled steel with a minimum yield strength of 70 ksi (485 MPa) and tensile strength of 80 ksi (550 MPa).

G. Unheaded Anchor Rods: [ASTM F 1554, Grade 36] [ASTM F 1554, Grade 55, weldable] [ASTM A 354] [ASTM A 449] [ASTM A 572/A 572M, Grade 50] [ASTM A 36/A 36M].

1. Configuration: [Straight] [Hooked].
4. Washers: ASTM F 436, Type 1, hardened carbon steel.
5. Finish: [Plain] [Hot-dip zinc coating, ASTM A 153/A 153M, Class C] [Mechanically deposited zinc coating, ASTM B 695, Class 50].

H. Headed Anchor Rods: [ASTM F 1554, Grade 36] [ASTM F 1554, Grade 55, weldable] [ASTM A 354] [ASTM A 449], straight.

3. Washers: ASTM F 436, Type 1, hardened carbon steel.
4. Finish: [Plain] [Hot-dip zinc coating, ASTM A 153/A 153M, Class C] [Mechanically deposited zinc coating, ASTM B 695, Class 50].

I. Threaded Rods: [ASTM A 36/A 36M] [ASTM A 193/A 193M, Grade B7] [ASTM A 354, Grade BD] [ASTM A 449] [ASTM A 572/A 572M, Grade 50].

2. Washers: [ASTM F 436, Type 1, hardened] [ASTM A 36/A 36M] carbon steel.
3. Finish: [Plain] [Hot-dip zinc coating, ASTM A 153/A 153M, Class C] [Mechanically deposited zinc coating, ASTM B 695, Class 50].

J. [Clevises] [and] [Turnbuckles]: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1035.

K. Eye Bolts and Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1030.

2.4 PRIMER

A. Interior Steel Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

B. Exterior Steel Primer: SSPC-Paint 20, Type I, Level 1 zinc rich coating.

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

2.5 GROUT

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

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

2.6 FABRICATION


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

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

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

C. Bolt Holes: Cut, drill, [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 1, "Solvent Cleaning."] [SSPC-SP 2, "Hand Tool Cleaning."] [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/D1.1M and manufacturer's written instructions.

G. Deformed Bar Anchors: Prepare steel surfaces as recommended by manufacturer of deformed bar anchors. Use stud welding gun in accordance with AWS D1.1 and manufacturer’s written instructions.

H. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural-steel frame. Straighten as required to provide uniform, square, and true members in completed wall framing. Build up welded framing, weld exposed joints continuously, and grind smooth.

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

J. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
   1. Cut, drill, or punch holes perpendicular to steel surfaces. [Do not thermally cut bolt holes or enlarge holes by burning.]
   2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
   3. Weld threaded nuts to framing and other specialty items indicated to receive other work.
   4. Expansion and Control Joints: Provide expansion joints in steel shelf angles when part of structural steel frame; locate at vertical masonry expansion joints as indicated on drawings. The gap between ends of angles shall equal the width of the masonry expansion joint. The angles shall have support within 8” of the joints. Provide mitered and welded units at corners.

2.7 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
   1. Joint Type: [Snug tightened] [Pretensioned] [Slip critical].

B. Weld Connections: Comply with AWS D1.1/D1.1M[ and AWS D1.8/D1.8M] for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
   1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

C. Design of Connections: Typical AISC connections are to be used except where otherwise shown. Details shown are typical; similar details apply to similar conditions, unless otherwise
indicated. Verify dimensions at site whenever possible without causing delay in the work. Promptly notify Architect whenever design of members and connections for any portion of structure are not clearly indicated.

D. Fabricate length of diagonal bracing to provide nominal tension in member when erected.

2.8 SHOP PRIMING

A. Shop prime steel surfaces except the following:
   1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
   2. Surfaces to be field welded.
   4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
   5. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
   1. SSPC-SP 2, "Hand Tool Cleaning."
   2. For interior steel not exposed to view: SSPC-SP 3, "Power Tool Cleaning."
   3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
   4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
   5. SSPC-SP 14/NACE No. 8, "Industrial Blast Cleaning."
   6. For exterior steel, interior steel exposed to view, and AESS: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
   7. For exterior steel, interior steel exposed to view, and AESS: SSPC-SP 10/NACE No. 2, "Near-White Blast Cleaning."
   8. SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning."
   9. For steel to be hot-dipped galvanized: SSPC-SP 8, "Pickling."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
   1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
   2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

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

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

1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize lintels, beam lintels, and shelf angles, located in exterior walls.

B. All welded assemblies to be galvanized shall be prepared according to Recommended Practice for Providing High Quality Zinc Coatings (Hot-Dip) on Assembled Products (ASTM A385).

2.10 SOURCE QUALITY CONTROL

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

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

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

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

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

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

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

E. Prepare test and inspection reports.
SECTION 05 3100 - STEEL DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

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

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

C. <Double click to insert sustainable design text for recycled content.>

2.2 ROOF DECK

A. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI RD 1.0-2006 Standard for Steel Roof Deck", and with the following:

1. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), [Grade 33] [Grade 40] [Grade 80] minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer.
a. Color: [Manufacturer's standard] [Gray] [White] [Gray top surface with white underside].

2. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), [Grade 33] [Grade 40] [Grade 80], [G60] [G90] zinc coating.

3. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), [Grade 33] [Grade 40] [Grade 80], G60 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.

a. Color: [Manufacturer's standard] [Gray] [White] [Gray top surface with white underside].

4. Aluminum-Zinc-Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Structural Steel (SS), Grade 33 minimum, AZ50 aluminum-zinc-alloy coating.

5. Deck Profile: [As indicated] [Type NR, narrow rib] [Type IR, intermediate rib] [Type WR, wide rib] [Type 3DR, deep rib] [Long span].

6. Cellular Deck Profile: [As indicated] [Type WR, wide rib] [Type 3DR, deep rib] [Long span], with bottom plate.

7. Profile Depth: [As indicated] [1-1/2 inches] [2 inches] [3 inches] [4-1/2 inches] [6 inches] [7-1/2 inches].

8. Design Uncoated-Steel Thickness: [As indicated] [0.0295 inch] [0.0358 inch] [0.0474 inch] [0.0598 inch] [0.0747 inch].

9. Design Uncoated-Steel Thicknesses; Deck Unit/Bottom Plate: [As indicated] [0.0358/0.0358 inch] [0.0358/0.0474 inch] [0.0474/0.0474 inch] [0.0474/0.0598 inch] [0.0598/0.0474 inch] [0.0598/0.0598 inch].

10. Span Condition: [As indicated] [Simple span] [Double span] [Triple span or more].

11. Side Laps: [Overlapped] [Interlocking seam] [Overlapped or interlocking seam at Contractor's option].

2.3 ACOUSTICAL ROOF DECK

A. Acoustical Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI RD 1.0-2006 Standard for Steel Roof Deck", and with the following:

1. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), [Grade 33] [Grade 40] [Grade 80] minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer.

a. Color: [Manufacturer's standard] [Gray] [White] [Gray top surface with white underside].

2. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), [Grade 33] [Grade 40] [Grade 80], [G60] [G90] zinc coating.

3. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), [Grade 33] [Grade 40] [Grade 80], G60 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.

a. Color: [Manufacturer's standard] [Gray] [White] [Gray top surface with white underside].
4. Aluminum-Zinc-Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Structural Steel (SS), Grade 33 minimum, AZ50 aluminum-zinc-alloy coating.

5. Deck Profile: [As indicated] [Type WR, wide rib] [Type 3DR, deep rib] [Long span].

6. Cellular Deck Profile: [As indicated] [Type WR, wide rib] [Type 3DR, deep rib] [Long span], with bottom plate.

7. Profile Depth: [As indicated] [1-1/2 inches] [2 inches] [3 inches] [4-1/2 inches] [6 inches] [7-1/2 inches].

8. Design Uncoated-Steel Thickness: [As indicated] [0.0295 inch] [0.0358 inch] [0.0474 inch] [0.0598 inch].

9. Design Uncoated-Steel Thicknesses; Deck Unit/Bottom Plate: [As indicated] [0.0358/0.0358 inch] [0.0358/0.0474 inch] [0.0474/0.0358 inch] [0.0474/0.0474 inch] [0.0474/0.0598 inch] [0.0598/0.0358 inch] [0.0598/0.0474 inch] [0.0598/0.0598 inch].

10. Span Condition: [As indicated] [Simple span] [Double span] [Triple span or more].

11. Side Laps: [Overlapped] [Interlocking seam] [Overlapped or interlocking seam at Contractor's option].

12. Acoustical Perforations: [Deck units with manufacturer's standard perforated vertical webs] [Cellular deck units with manufacturer's standard perforated flat-bottom plate welded to ribbed deck].

13. Sound-Absorbing Insulation: Manufacturer's standard premolded roll or strip of glass or mineral fiber. <Insert actual physical properties and thicknesses of insulation>.

   a. Factory install sound-absorbing insulation into cells of cellular deck.
   b. Installation of sound-absorbing insulation is specified in Section <Insert Section number> "<Insert Section title>".

14. Acoustical Performance: NRC [0.65] [0.75] [0.80] [0.85] [0.90], tested according to ASTM C 423.

2.4 COMPOSITE FLOOR DECK

A. Composite Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI C 1.0-2006 Standard for Composite Steel Deck", with the minimum section properties indicated, and with the following:

1. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), [Grade 33] [Grade 40] [Grade 80] minimum, with top surface phosphatized and unpainted and underside surface shop primed with manufacturers' standard [gray] [or] [white] baked-on, rust-inhibitive primer.

2. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33, [G30] [G60] [G90] zinc coating.

3. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33, [G30] [G60] zinc coating; with unpainted top surface and cleaned and pretreated bottom surface primed with manufacturer's standard [gray] [white] baked-on, rust-inhibitive primer.

4. Profile Depth: [1-1/2 inches] [2 inches] [3 inches] [As indicated].

5. Design Uncoated-Steel Thickness: [0.0295 inch] [0.0358 inch] [0.0474 inch] [0.0598 inch].

6. Span Condition: [As indicated] [Simple span] [Double span] [Triple span or more].
2.5 NONCOMPOSITE FORM DECK

A. Noncomposite Form Deck: Fabricate ribbed-steel sheet noncomposite form-deck panels to comply with "SDI NC 1.0-2006 Standard for Non-Composite Steel Deck", with the minimum section properties indicated, and with the following:

1. Uncoated Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), [Grade 33] [Grade 40] [Grade 80] minimum.
2. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), [Grade 33] [Grade 40] [Grade 80] minimum, with [top and] underside surface shop primed with manufacturer's standard baked-on, rust-inhibitive primer.
   a. Color: [Manufacturer's standard] [Gray] [White] [Gray top surface with white underside].
3. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), [Grade 33] [Grade 40] [Grade 80], [G30] [G60] [G90] zinc coating.
4. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), [Grade 33] [Grade 80], G60 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.
   a. Color: [Manufacturer's standard] [Gray] [White] [Gray top surface with white underside].
5. Profile Depth, Thickness, Span and Configuration: Provide deck of depth, thickness, and configuration to support the dead load of the concrete plus 25 pounds per square foot construction loads while sustaining only a maximum of L/240 deflection when placed over number of spans used.
6. Span Condition: [As indicated] [Simple span] [Double span] [Triple span or more].
7. Side Laps: [Overlapped] [Interlocking seam] [Overlapped or interlocking seam at Contractor's option].

2.6 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. 10 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, not less than 0.0359-inch 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, of same material and finish as deck, and of thickness and profile [indicated] [recommended by SDI C or NC standards for overhang and slab depth].

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

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

I. Rolled-in Hanger Tabs: Rolled-in steel sheet hanger attachment devices for use with composite floor deck only.

J. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, [0.0598 inch] [0.0747 inch] thick, with factory-punched hole of 3/8-inch minimum diameter.

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

L. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck, with 3-inch-wide flanges and [level] [sloped] recessed pans of 1-1/2-inch minimum depth. For drains, cut holes in the field.

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

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

END OF SECTION 05 3100
2.03 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. Application: Exterior curtain wall/ veneer backup
   2. Minimum Base-Metal Thickness: 0.0428 inch (18 gage), or as required to meet design criteria.
   3. Flange Width: as required to meet design criteria.
   4. Depth: As indicated on the drawings
   5. Spacing: As required to meet design criteria, max. 16-in. o.c.

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: 0.0538 inch (16 gage).
   2. Flange Width: 1-1/4 inches to 2-1/4 inches.

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

D. 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: 0.0428 inch (18 gage).
      b. Flange Width: 1 inch plus twice the design gap.
   2. Inner Track: Of web depth indicated, and as follows:
      a. Minimum Base-Metal Thickness: 0.0428 inch (18 gage).
      b. Flange Width: Dimension equal to sum of outer deflection track flange width plus 1 inch.
   3. Contractor's option: Single Deflection Track
      a. Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure.
      b. Minimum Base-Metal Thickness: 0.0538 inch (16 gage).
      c. Flange Width: 1 inch plus twice the design gap, or as recommended by Manufacturer for each specific application.

E. 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.

F. Headers and Jambs, Heavy Duty Stud: Manufacturer’s standard shapes used to form beams, jambs, columns or posts of web depths indicated, unpunched, with stiffened flanges.
   1. Product: ClarkDietrich Building Systems; Heavy Duty Stud (HDS) and Header Bracket (HDSC).

G. Zee-channel furring framing for wood panel substrate at exterior metal wall cladding: ASTM A 36, ASTM A 123 G-90 hot-dipped zinc-coating.
1. 1.5-in. web depth; min. 1-in. flange; min. 18-ga. or as otherwise determined pursuant to engineering requirements of Part 1 Article “Quality Assurance”

2. Application Summary:
   a. At composite metal panel cladding on studwall backup: Install horizontally at 16 inches o.c., with outboard flange turned down, fastened through sheathing to metal studs, providing backup for wood panel substrate, with rigid foil-faced polyisocyanurate board installed securely in cavity space.
   b. At formed metal panel cladding on masonry backup - Install in two layers
      1) First layer installed vertically at 16 inches o.c., anchored through fluid-applied air barrier to masonry backup, providing backup for second layer of zee furring, with extruded polystyrene board cavity insulation installed securely in cavity space.
      2) Second layer installed horizontally at 16 in. o.c., with outboard flange turned down, fastened to flange of vertical zee channels, providing backup for wood panel substrate, with extruded polystyrene board cavity insulation installed securely in cavity space.

2.04 FRAMING ACCESSORIES

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

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, including the following, as appropriate:
   1. Supplementary framing.
   2. Bracing, bridging, and solid blocking.
   3. Anchor clips.
   4. End clips.
   5. Foundation clips.
   7. Stud kickers, knee braces, and girts.
   8. Hole reinforcing plates.

2.05 ANCHORS, CLIPS, AND FASTENERS

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

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

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.

2.06 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or 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 thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

F. Electrical Grommets: Snap bushing with hole-diameter of 1-1/8 inches

2.07 WALL SHEATHING

A. Glass-Mat Gypsum Sheathing Board; ASTM C 1177, or Cellulose Fiber-Reinforced Gypsum Sheathing: ASTM C 1278.
   1. Type and Thickness: Regular, 1/2 inch thick.
   2. Available Products: Subject to compliance with requirements:
      a. "Dens-Glass Gold" by G-P Gypsum Corp.
      b. “GlasRoc” by Georgia Pacific
      c. "Fiberock Sheathing with Aqua-Tough" by United States Gypsum Co.

2.08 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, plasma cutting or shearing; do not torch cut.
3. Fasten cold-formed metal framing members by welding, screw fastening, bolt connection, 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 in compliance with AISI fabrication tolerances for level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
   1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
   2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.

2.09 ROOF AIR BARRIER

A. As specified under Division 07 Roofing Sections

2.10 SHEATHING ACCESSORIES

A. Joint-and-Penetration Treatment:
   1. Sealant for Glass-Mat Gypsum Sheathing Board: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing, and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.
   2. Sheathing Tape for Glass-Mat Gypsum Sheathing Board: Self-adhering glass-fiber tape, minimum 2 inches wide, 10 by 10 or 10 by 20 threads/inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing board and with a history of successful in-service use.

B. Fasteners: Provide fasteners of size and type indicated or recommended by sheathing and stud manufacturers that comply with requirements specified for material and manufacture.
   1. Steel drill screws, ASTM C 954, in length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

C. Adhesives for Field Gluing Panels to Framing: Formulation complying with ASTM D 3498 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.
D. Flexible Flashing: Coordinate with requirements of Division 04 Section "Unit Masonry Assemblies."
   1. Primer for Flexible Flashing: Product recommended by manufacturer of flexible flashing for substrate.

END OF SECTION 05 4000
SECTION 05 5000 - METAL FABRICATIONS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following fabrications, including Design and Engineering requirements for load-resisting assemblies, and coordination with other assemblies and systems.
   1. Steel framing and supports for mechanical and electrical equipment.
   2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
   3. Loose steel lintels
   4. Miscellaneous steel trim including steel edgings and angles.
   5. Metal ladders and cages.
   6. Roof perimeter accessory steel where not specified in other Sections.

B. Related Sections:
   1. Division 03 and 04 Sections for loose steel lintels, anchor bolts, steel pipe sleeves, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
   2. Division 05 Section “Structural Steel Framing” for general structural requirements of steel design and fabrication.

PART 2 - PRODUCTS

2.01 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.

2.02 METALS

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

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

C. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

D. Slotted Channel Framing: Cold-formed metal channels with continuous slot complying with MFMA-3.
   2. Material: Galvanized steel complying with ASTM A 653, commercial steel, Type B, with G90 coating.

E. Cast Iron: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.
2.03 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, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36.
   1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.

D. Eyebolts: ASTM A 489.

E. Machine Screws: ASME B18.6.3.

F. Lag Bolts: ASME B18.2.1.

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


J. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, 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.

2.04 MISCELLANEOUS MATERIALS

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

B. Low-Emitting Materials: Field-applied primers and coatings within the building enclosure 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."

C. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with scheduled topcoat.
   2. Carboline Company; Carbozinc 621.
   4. Sherwin-Williams Company (The); Corothane I GalvaPac Zinc Primer.


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

F. 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.

G. Concrete Materials and Properties: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 4000 psi, unless otherwise indicated.

2.05 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, 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 true to line and level 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 where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, 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, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.06 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 retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.

C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.

D. Galvanize miscellaneous framing and supports where at exterior locations and in or attached to exterior walls.

E. Prime miscellaneous framing and supports with zinc-rich primer, except as otherwise indicated.

2.07 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, with member size as indicated in Loose Lintel Schedule on Structural Drawings. Weld adjoining members together to form a single unit where indicated.

B. Hot-dip galvanize loose steel lintels located in exterior walls, and provide high-performance shop prime coat on surfaces exposed to view. Use products specified in Section 05 1200 for exterior steel surfaces exposed to view and compatible with finish coat scheduled in Division 09 Section for painting.
      a. Adhesion – ASTM D3359; no less than a rating of 5.
      b. Salt Spray (Fog) – ASTM B117. No blistering, cracking, rusting, or delamination of film. No more than 1/32 inch rust creepage at scribe after 10,000 hours exposure.
      c. Non-Lead – ASTM D520 Type II; less than 0.06% lead.

2.08 LOOSE ROOF NAILER ATTACHMENT STEEL

A. Fabricate loose steel pieces, continuous lengths and clips, from steel angles and bent plates, of size and dimensions indicated or otherwise required to anchor dimension lumber to structure at roof perimeters, expansion joints, parapets and miscellaneous roof transitions. Drill pieces to receive anchor bolts and for grouting.
B. Size and detail pieces for field welding or bolting to deck bearing plates or to joist top chords, or for grouting to top of CMU wall, and to receive through-bolts for wood attachment at size and spacing indicated.

C. Galvanize pieces after fabrication.

2.09 LOOSE BEARING AND LEVELING PLATES

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

B. Galvanize plates after fabrication when installed in exterior walls.

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 not less than two integrally welded steel strap anchors for embedding in concrete.

2.11 MISCELLANEOUS STEEL TRIM

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

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
   1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

C. Galvanize exterior miscellaneous steel trim, except as otherwise indicated.

D. Prime interior miscellaneous steel trim, with zinc-rich primer, except as otherwise indicated.

2.12 METAL LADDER

A. General:
   1. Comply with ANSI A14.3, unless otherwise indicated.
   2. For elevator pit ladder, comply with ASME A17.1.
   3. Space siderails 18 inches apart, unless otherwise indicated.
   4. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted brackets, made from same metal as ladder.

B. Steel Ladder:
   1. Siderails: Continuous, 1/2-by-2-1/2-inch steel flat bars, unless otherwise shown, with eased edges.
   3. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
4. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.

C. Shop Prime Finish:
1. Galvanize exterior and interior ladders, including brackets and fasteners.
2. Prepare galvanized surfaces and provide shop-applied prime coat compatible with scheduled finish coat on entire assembly exposed to view.
   a. Exterior assemblies: Use products specified in Section 05 1200 for exterior steel exposed to view.
   b. Interior assemblies: Use products specified in Section 05 1200 for interior steel exposed to view.

2.13 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.

2.14 STEEL AND IRON FINISHES
A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
   1. ASTM A 123, for galvanizing steel and iron products.
   2. ASTM A 153, for galvanizing steel and iron hardware.

B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
   1. Exteriors (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
   2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."

C. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
   1. Verify compatibility with scheduled finish coating as specified in Division 09 Section for Painting.
   2. Comply with applicable requirements of Section 05 1200 for shop priming of steel, for appropriate exposure and finish.

END OF SECTION 05 5000
SECTION 05 5100 - METAL STAIRS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes:
   1. Preassembled steel stairs with concrete-filled treads.
   2. Steel guard and rail assemblies as part of stair construction.
   3. Design and Engineering requirements for load-resisting assemblies.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Products: Subject to compliance with requirements, provide one of the products specified.

2.02 METALS, GENERAL

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

2.03 FERROUS METALS

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

B. Steel Tubing: ASTM A 500 (cold formed) or ASTM A 513, Type 5 (mandrel drawn).

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. Iron Castings: Either gray or malleable iron, unless otherwise indicated.
   1. Gray Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.
   2. Malleable Iron: ASTM A 47/A 47M.

E. Uncoated, Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, structural steel, Grade 30, unless another grade is required by design loads.

F. Galvanized Steel Sheet for Exterior and Mechanical Room Stairs: ASTM A 653/A 653M, G90 coating, structural steel, Grade 33, unless another grade is required by design loads.

G. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.
H. Apply bituminous paint to concealed bottoms, sides, and edges of cast-metal units set into concrete.

2.04 FASTENERS

A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 25 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required.

B. Fasteners for Anchoring Railings 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.

C. Fasteners for Interconnecting Railing Components:
   1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work.
   2. Provide tamper-resistant flat-head machine screws for exposed fasteners, unless otherwise indicated.

2.05 MISCELLANEOUS MATERIALS

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

B. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.
   3. Sherwin-Williams Company (The); Corothane I GalvaPac Zinc Primer.


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


F. Concrete Materials and Properties: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

G. Welded Wire Reinforcement: ASTM A 185, 6 by 6 inches --W1.4 by W1.4, unless otherwise indicated.

2.06 FABRICATION, GENERAL

A. Provide complete stair assemblies, including metal framing, hangers, struts, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
   1. Join components by welding, unless otherwise indicated.
2. Use connections that maintain structural value of joined pieces.

B. Preassembled Stairs: Assemble stairs in shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

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

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

E. Form exposed work true to line and level with accurate angles and surfaces and straight edges.

F. Weld connections 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.

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

H. Fabricate joints that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

2.07 STEEL-FRAMED STAIRS

A. Available Manufacturers:
   1. Alfab, Inc.
   2. American Stair Corp.
   3. Sharon Companies Ltd. (The).

B. Stair Framing:
   1. Fabricate stringers of steel plates or channels and tubes.
      a. Provide closures for exposed ends of channel stringers.
      b. Provide tube stringers for ornamental stairs where indicated on the Drawings.
   2. Construct platforms of steel plate or channel headers and miscellaneous framing members as needed to comply with performance requirements.
   3. Weld stringers to headers; weld framing members to stringers and headers.
   4. Where stairs are enclosed by gypsum board assemblies, provide hanger rods or struts to support landings from floor construction above or below. Locate hanger rods and struts where they will not encroach on required stair width and will be within the fire-resistance-rated stair enclosure.
5. Where masonry walls support metal stairs, provide temporary supporting struts designed for erecting steel stair components before installing masonry.

C. Metal-Pan Stairs: Form risers, sub tread pans, and subplatforms to configurations shown from steel sheet of thickness needed to comply with performance requirements but not less than 0.0677 inch.

1. Steel Sheet: Uncoated hot-rolled steel sheet, unless otherwise indicated.

2. Directly weld metal pans to stringers; locate welds on top of sub treads where they will be concealed by concrete fill. Do not weld risers to stringers.

3. At Contractor's option, provide stair assemblies with metal-pan sub treads filled with reinforced concrete during fabrication.

4. Provide sub platforms of configuration indicated or, if not indicated, the same as sub treads. Weld sub platforms to platform framing.

   a. Smooth Soffit Construction: Construct sub platforms with smooth soffits.

2.08 STEEL TUBE RAILINGS

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of tube, post spacings, and anchorage, but not less than that needed to withstand indicated loads.

1. Configuration: As detailed on Drawings

B. Welded Connections: Fabricate railings with welded connections. Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

C. Form changes in direction of railings as detailed, by radius bends of radius indicated.

D. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

E. Close exposed ends of railing members with prefabricated end fittings.

F. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

G. Brackets, Flanges, Fittings, and Anchors: Provide brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.

2.09 FINISHES

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

B. Finish metal stairs after assembly.

C. Galvanizing For Exterior Stairs: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
1. ASTM A 123/A 123M, for galvanizing steel and iron products.
2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

D. Preparation for Shop Priming For Interior Stairs: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed products:
   1. Interior Stairs (SSPC Zone 1A): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

E. Apply shop primer to uncoated surfaces of metal stair components, except those with galvanized finishes and those to be embedded in concrete or masonry unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

2.10 STEEL AND IRON FINISHES

A. Fill vent and drain holes that will be exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.

C. For nongalvanized steel, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors to be embedded in exterior concrete or masonry.

D. Preparation for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic-phosphate process.

E. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed railings:
   1. Exterior (SSPC Zone 1B): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
   2. Interior (SSPC Zone 1A): SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."

F. Apply shop primer to prepared surfaces, unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
   1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

END OF SECTION 05 5100
SECTION 05 5213 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Interior painted steel architectural tube railings.
   2. Stainless Steel handrails

B. Related Sections include the following:
   1. Division 05 Section “Metal Stairs” for steel railings attachment to steel stairs.
   2. Division 06 Section "Miscellaneous Rough Carpentry" for wood blocking for anchoring railings.

PART 2 - PRODUCTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Steel Pipe and Tube Railings:
      a. Pisor Industries, Inc.
      b. Sharpe Products.
      c. Wagner, R & B, Inc.; a division of the Wagner Companies.
      d. Local fabricator, subject to requirements and prior approval.

2.02 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: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

2.03 STEEL AND IRON

A. Tubing: ASTM A 500 (cold formed) or ASTM A 513, Type 5 (mandrel drawn).

B. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
   1. Provide galvanized finish for interior locations where indicated.

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

D. Castings: Either gray or malleable iron, unless otherwise indicated.
   1. Gray Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.
   2. Malleable Iron: ASTM A 47/A 47M.
2.04 ALUMINUM

A. Aluminum, General: Provide alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum form required.

B. Extruded Bars and Tubing: ASTM B 221, Alloy 6063-T5/T52.

   1. Provide Standard Weight (Schedule 40) pipe, unless otherwise indicated.

D. Drawn Seamless Tubing: ASTM B 210, Alloy 6063-T832.


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. Plate and Sheet: ASTM A 666, Type 304.

2.06 FASTENERS

A. General: Provide the following:
   1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 for zinc coating.
   2. Hot-Dip Galvanized Railings: Type 304 stainless-steel or hot-dip zinc-coated steel fasteners complying with ASTM A 153/A 153M or ASTM F 2329 for zinc coating.
   3. Aluminum Railings: Type 316 stainless-steel fasteners.

B. Fasteners: Provide concealed fasteners, unless unavoidable or standard for railings indicated. 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.

C. Fasteners for Anchoring Railings 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.

D. Fasteners for Interconnecting Railing Components:
   1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated or specifically allowed.
E. Anchors: Provide cast-in-place, chemical and torque-controlled expansion anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

2.07 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
   1. For aluminum railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

B. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.
   1. Products: Subject to compliance with requirements, provide one of the following:
      c. Sherwin-Williams Company (The); Corothane I GalvaPac Zinc Primer.


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


F. 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.
   1. Water-Resistant Product: At exterior locations provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

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. Shop assemble railings 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, 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. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

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

G. Connections: Fabricate railings with either welded or nonwelded connections.

H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
   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 flux immediately.
   4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

I. Welded Connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.

J. Nonwelded 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.

K. Form changes in direction as follows: By bending or by inserting prefabricated elbow fittings.

L. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

M. Close exposed ends of railing members with prefabricated end fittings.

N. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

O. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work, unless otherwise indicated.
   1. At brackets and fittings fastened to plaster or gypsum board partitions, provide fillers made from crush-resistant material, or other means to transfer wall loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

P. 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.

Q. For railing posts set in concrete, provide sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with steel plate forming bottom closure.
R. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

2.09 FINISHES, GENERAL

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

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

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.10 STEEL AND IRON FINISHES

A. Galvanized Railings:
   1. Hot-dip galvanzize indicated steel and iron railings, including hardware, after fabrication.
   2. Comply with ASTM A 123/A 123M for hot-dip galvanized railings.
   4. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
   5. Fill vent and drain holes that will be exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.

C. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.

D. For nongalvanized steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors to be embedded in exterior concrete or masonry.

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

F. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
   1. Do not apply primer to galvanized surfaces.

2.11 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
B. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
   1. Color: As selected by Architect from full range of industry colors and color densities.

2.12 STAINLESS-STEEL FINISHES

A. Remove tool and die marks and stretch lines or blend into finish.

B. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

C. Directional Satin Finish: No. 4.

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

END OF SECTION 05 5213
SECTION 05 5217  STAIR RAIL MODIFICATION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes:
1. Modification to existing steel guard and rail assemblies.
2. Design and Engineering requirements for load-resisting assemblies.

B. Related Sections:
1. Division 06 Section "Architectural Woodwork/ Finish Carpentry" for wood handrail assembly.
2. Division 09 Section "Painting" for final field coats.

PART 2 - PRODUCTS

2.01 METALS, GENERAL

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

2.02 FERROUS METALS

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

B. Steel Tubing: ASTM A 500 (cold formed) or ASTM A 513, Type 5 (mandrel drawn).

C. Iron Castings: Either gray or malleable iron, unless otherwise indicated.
1. Gray Iron: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.

D. Uncoated, Hot-Rolled Steel Sheet: ASTM A 1011, structural steel, Grade 30, unless another grade is required by design loads.

E. Apply bituminous paint to concealed bottoms, sides, and edges of cast-metal units set into concrete.

2.03 FASTENERS

A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 25 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required.

B. Fasteners for Anchoring Railings 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.
C. Fasteners for Interconnecting Railing Components:
1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work.
2. Provide tamper-resistant flat-head machine screws for exposed fasteners, unless otherwise indicated.

2.04 MISCELLANEOUS MATERIALS

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

B. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.
   3. Sherwin-Williams Company (The); Corothane I GalvaPac Zinc Primer.

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


2.05 FABRICATION, GENERAL

A. Provide complete stair assemblies, including metal framing, hangers, struts, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
   1. Join components by welding, unless otherwise indicated.
   2. Use connections that maintain structural value of joined pieces.

B. Assemble fabrications in shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

A. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns, unless clearance between end of rail and wall is 1/4 inch or less.

A. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
   1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers, or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.

B. 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.

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

E. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
   1. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

F. Form, cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, bolts and similar items. Install exposed work true to line and level with accurate angles and surfaces and straight edges.

G. Weld connections 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.

H. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use tamper-resistant flat-head machine screws for exposed fasteners or bolts unless otherwise indicated. Locate joints where least conspicuous.

I. Close exposed ends of hollow railing members with prefabricated end fittings.

J. Fabricate joints that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

2.06 RAILING EXTENSION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of tube, post spacings, and anchorage, but not less than that needed to withstand indicated loads.
   1. Configuration: As detailed on Drawings

B. Welded Connections: Fabricate railings with welded connections. Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

C. Form changes in direction of railings as detailed, by radius bends of radius indicated.

D. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
E. Close exposed ends of railing members with prefabricated end fittings.

F. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

G. Brackets, Flanges, Fittings, and Anchors: Provide brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.

2.07 FINISHES

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

B. Finish fabrications after assembly.

C. Preparation for Shop Priming For Interior Stairs: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed products:
   1. Interior Stairs (SSPC Zone 1A): SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning" or SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning" as recommended by coating manufacturer.

D. Apply shop primer to prepared uncoated surfaces, unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry. Stripe paint corners, crevices, bolts, welds, and sharp edges.

E. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

F. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

END OF SECTION 05 5217
SECTION 06 1053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes lumber and panel products used in miscellaneous construction.
   1. Wood blocking, cants, and nailers.
   2. Roof nailers and blocking.
   3. Shelving and accessories.
   4. Wood furring and grounds.
   5. Plywood backing panels.

B. Related Sections include the following:
   1. Division 05 Section "Metal Fabrications" for miscellaneous roof framing and lumber anchorage to structure.
   2. Division 06 Section "Architectural Woodwork" for interior woodwork not specified in this Section.
   3. Division 07 Section "Roof Accessories" for manufactured curbs for mounting roof equipment and expansion assemblies (Contractor's Option).

PART 2 - PRODUCTS

2.01 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
   3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
   4. Provide dressed lumber, S4S, unless otherwise indicated.
   5. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

B. Wood Structural Panels:
   1. Plywood: Either DOC PS 1 or DOC PS 2, unless otherwise indicated.
   2. Thickness: As needed to comply with requirements specified but not less than thickness indicated.
   4. Factory mark panels according to indicated standard.
2.02 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: C9 AWPA C2 (lumber) and AWPA (plywood), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).

B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

D. Application: Treat items indicated on Drawings and the following as applicable:
   1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
   2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
   3. Wood floor plates and framing that are installed in direct contact with concrete slabs.

2.03 FIRE-RETARDANT-TREATED MATERIALS

A. General: Comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood).
   1. Use treatment that does not promote corrosion of metal fasteners.
   2. Use Exterior type for exterior locations and where indicated.
   3. Use Interior Type A, High Temperature (HT) for enclosed framing and interior locations where indicated.
   4. Use Interior Type A, unless otherwise indicated.

B. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
   1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.

C. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

D. Application:
   1. Treat items indicated on Drawings, and where permitted by IBC 2009 Section 603.1, Item 1.
   2. Treat wood framing and deck used for raised platforms constructed in accordance with IBC 2009 Section 410.4.
   3. Treatment not required for items in concealed spaces and over a noncombustible roof deck, if used for blocking, nailers and furring where permitted by IBC 2009 Sections 603.4, .14 and .18.
2.04 DIMENSION LUMBER

A. General: Provide dimension lumber of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated.

B. For items of dimension lumber size, provide Construction, or No. 2 grade lumber with 19 percent maximum moisture content and any of the following species:
   1. Mixed southern pine; SPIB.
   2. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
   3. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.

2.05 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including the following:
   1. Rooftop equipment bases and support curbs.
   2. Blocking.
   3. Cants.
   5. Furring.

B. Concealed Boards: Provide lumber with 19 percent maximum moisture content and any of the following species and grades:
   1. Mixed southern pine, No. 2 grade; SPIB.
   2. Hem-fir or Hem-fir (north), Construction or 2 Common grade; NLGA, WCLIB, or WWPA.
   3. Spruce-pine-fir (south) or Spruce-pine-fir, Construction or 2 Common grade; NELMA, NLGA, WCLIB, or WWPA.

2.06 PANEL PRODUCTS

A. Miscellaneous Concealed Plywood: Exterior or Exposure 1 sheathing, span rating to suit framing in each location, and thickness as indicated but not less than 1/2 inch.

B. Miscellaneous Exposed Plywood: DOC PS 1, A-D Interior, thickness 1/2 inch or as indicated.

C. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2 inch-thick.

2.07 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
   1. Where carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or Type 304 stainless steel.


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

D. Wood Screws: ASME B18.6.1.
E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

F. Lag Bolts: ASME B18.2.1.

G. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
   2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

END OF SECTION 06 1053
PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Interior standing and running trim and casing.
   2. Solid-surface miscellaneous applications (monolithic sheet)
   3. Built-in display cases, casework, and accessories.
   4. Shelving.
   5. Trim and Accessories

B. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips, unless concealed within other construction before woodwork installation.

C. Related Sections include the following:
   1. Division 06 Section "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.
   2. Division 09 Section "Painting" for field finishing of interior architectural woodwork.
   4. Division 12 Section “Manufactured Casework” for stock wood-bodied casework and custom fabricated casework, counters, and miscellaneous plastic-laminate panels.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

B. Wood Species and Cut for Transparent Finish:
   1. Exposed Trim and Panel Edge Banding: Red Oak
   2. Panel Veneer Products: Red Oak, Quarter sawn or sliced

C. Wood Species for Opaque Finish: Any closed-grain hardwood, unless otherwise indicated.

D. Assembly of Veneer Leaves on Panel Faces: Running match.
   a. Room Match: Provide panel faces of compatible color and grain within each separate room or area of building.

E. Wood Species for Opaque Finish:

F. Exposed Trim and Edging: Any closed-grained hardwood, or primed MDF, subject to Architect’s approval.
1. Panel Products: Any closed-grain hardwood, or Medium-Density Overlay, subject to Architect’s approval.

G. Wood Products: Comply with the following:
   2. Tempered Hardboard: 4-ft by 8-ft by 1/4-in Polymer-impregnated high-density fiberboard panels, ANSI A135.4 Tempered Masonite by Masonite International Corporation
      a. Decorative Panels International; 800.521.4301; www.decpanels.com
      b. Panel Processing, Inc, 800-433-7142; www.panel.com
      c. Georgia Pacific; www.gp.com
   3. Medium-Density Fiberboard: ANSI A208.2, Grade MD.

H. Solid-Surface Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2, as specified in Section 12 3200. Provide patterns and colors as scheduled or otherwise approved, from the same source as materials furnished under Section 12 3200.

I. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.
   1. Manufacturer: Subject to compliance with requirements, provide high-pressure decorative laminates by approved manufacturer of products specified under 12 3200.
   2. Edgebanding for Plastic Laminate: Rigid PVC extrusions, through color with satin finish, 3 mm thick at doors and drawer fronts, 1 mm thick elsewhere applied with hot melt adhesive and radiused by automatic trimmers.
      a. Manufacturer: Subject to compliance with requirements, provide high-pressure decorative laminates by approved manufacturer of products specified under 12 3200
      b. All Exposed outside corners shall be furnished with a 1 inch radius with continuous edgebanding along radius

   1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

K. Clear Tempered Float Glass for Doors, shelves and mirrors: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality q3; manufactured by horizontal (roller hearth) process, with exposed edges seamed before tempering, 6 mm thick, unless otherwise indicated.
   1. Provide polished edges for shelves and doors.

L. Closet rod: 1-inch diameter 14 gage round tubing with matching 2-1/2-inch round cast metal O-flange and U-flange, for screw mount to wall.
   1. Finish: Powdercoat finish to selected by architect.
2.02 FIRE-RETARDANT-TREATED (FRT) MATERIALS

A. General: Where fire-retardant-treated materials are indicated or required by authorities having jurisdiction, use materials complying with requirements in this Article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified.
   1. Do not use treated materials that do not comply with requirements of referenced woodworking standard or that are warped, discolored, or otherwise defective.
   2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
   3. Identify fire-retardant-treated materials with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Comply with performance requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Use the following treatment type:
   1. Interior Type A: Low-hygroscopic formulation.
   2. Mill lumber before treatment and implement special procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of treated woodwork.
   3. Kiln-dry materials before and after treatment to levels required for untreated materials.

C. Fire-Retardant Particleboard: Panels complying with the following requirements, made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 25 or less per ASTM E 84.
   1. For panels 3/4 inch thick and less, comply with ANSI A208.1 for Grade M-2 except for the following minimum properties: modulus of rupture, 1600 psi; modulus of elasticity, 300,000 psi; internal bond, 80 psi; and screw-holding capacity on face and edge, 250 and 225 lbf, respectively.
   2. For panels 13/16 to 1-1/4 inches thick, comply with ANSI A208.1 for Grade M-1 except for the following minimum properties: modulus of rupture, 1300 psi; modulus of elasticity, 250,000 psi; linear expansion, 0.50 percent; and screw-holding capacity on face and edge, 250 and 175 lbf, respectively.
   3. Product: Subject to compliance with requirements, provide "Duraflake FR" by Weyerhaeuser.

D. Fire-Retardant Fiberboard: Medium-density fiberboard panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 200 or less per ASTM E 84.
   1. Product: Subject to compliance with requirements, provide "Medite FR" by SierraPine Ltd.; Medite Div.
2.03 INSTALLATION MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance.

C. Adhesives, General: Do not use adhesives that contain urea formaldehyde.

D. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   1. Wood Glues: 30 g/L.
   2. Contact Adhesive: 250 g/L.

2.04 FABRICATION, GENERAL


B. Interior Woodwork Grade: Provide Custom grade interior woodwork complying with the referenced quality standard, unless otherwise specified.

C. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and installation areas.

D. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

E. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:

F. Solid-Surface Fabrications: Matte finish with gloss rating of 5-20.
   1. Casework countertops: Refer to Section 12 3200
   2. Custom counter and finish fabrications: Fabricate as detailed, similar to casework countertops, except using plywood substrates in lieu of particleboard.

G. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
   1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
   2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after
trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.

H. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
   1. Seal edges of openings in countertops with a coat of varnish.

2.05 FABRICATION QUALITY

A. Quality Standard: AWI "Architectural Woodwork Quality Standards." Except as otherwise specified, comply with the following minimum standards:
   1. Standing and Running Trim, Section 300: Custom Quality
   2. Architectural Cabinets, Section 400: Custom Quality
   3. Flush Wood Paneling, Section 500. Custom Quality

2.06 INTERIOR STANDING AND RUNNING TRIM AND CASING FOR TRANSPARENT FINISH

A. Quality Standard: Comply with AWI Section 300.
   1. Grade: Premium.

B. Hardwood casing profiles by Baird Brothers Sawmill, Inc; 800 732 1697; for use as detailed or otherwise approved by Architect:

C. Wood Species and Cut: Hardwood as detailed and scheduled.

D. For trim items wider than available lumber, use veneered construction. Do not glue for width.

E. Back out or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.

F. Assemble casings in plant except where limitations of access to place of installation require field assembly.

G. Assemble moldings in plant to maximum extent possible. Miter corners in plant and prepare for field assembly with bolted fittings designed to pull connections together.

2.07 INTERIOR STANDING AND RUNNING TRIM FOR OPAQUE FINISH

A. Quality Standard: Comply with AWI Section 300.
   1. Grade: Premium.

B. Back out or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.

C. Assemble casings in plant except where limitations of access to place of installation require field assembly.

D. Assemble moldings in plant to maximum extent possible. Miter corners in plant and prepare for field assembly with bolted fittings designed to pull connections together.
E. Wood Species, as approved and appropriate for specific use:
   1. Any closed-grain hardwood.
   2. Medium-density overlay (MDO)
   3. Medium-density fiberboard (MDF)

2.08 CUSTOM-BUILT DISPLAY CASES

A. Provide interior ornamental work for transparent finish:
   1. Grade: Custom.

B. Wood Species and Cut: As indicated in Drawings.

C. Provide shop-fabricated and shop-finished units as shown and detailed, ready for field installation.
   1. Fabricate in shop to the maximum extent practicable.
   2. Coordinate with work of other affected Prime Contracts.

D. Shelves:
   1. Shelving material: As indicated in Drawings.
      a. Brackets and Standards: As indicated in Drawings.
         1) Factory powder coat finish on standards and brackets; color as indicated.

2.09 LOCKER ROOM SHOWER BENCHES

A. Provide bench units with overall assembly height of 17-1/2 inches.

B. Bench Tops: Manufacturer's standard one-piece units; 1 1/4 inches thick; laminated clear hard maple with one coat of clear sealer on all surfaces and one coat of clear lacquer on top and sides; with rounded corners and edges.
   1. Furnish all bench tops from same source.

2.10 SHOP FINISHING

A. Quality Standard: Comply with AWI Section 1500, unless otherwise indicated.
   1. Grade: Provide finishes of same grades as items to be finished.

B. Finish Architectural Woodwork at Fabrication Shop. Defer only final touchup, cleaning, and polishing until after installation.

C. General: To the greatest extent possible shop finish transparent finished interior architectural woodwork at fabrication shop as specified in this Section.
   1. Defer only final touchup, cleaning, and polishing until after installation.
   2. Refer to Division 09 Section "Painting" for field-finishing opaque finished architectural woodwork.

D. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling.

E. Preparations for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.
F. Transparent Finish: Comply with requirements indicated below for grade, finish system, staining, and sheen, with sheen measured on 60-degree gloss meter per ASTM D 523:

1. Grade: Premium.
2. AWI Finish System: Conversion varnish.
3. Staining: Match approved sample for color as selected by Architect.
4. Wash Coat for Stained Finish: Apply a wash-coat sealer to woodwork made from closed-grain wood before staining and finishing.

END OF SECTION 06 4000
SECTION 07 1300 - SHEET WATERPROOFING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following: Rubberized-asphalt sheet waterproofing and drainage accessories, used at below-grade walls enclosing occupied spaces, elevator pits, and as otherwise indicated.
   1. Optional fluid-applied waterproofing, subject to conditions and prior approval.

B. Related Section:
   1. Section 07 9200 "Joint Sealants" for joint-sealant materials and installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the following Rubberized-Asphalt Sheet Waterproofing products:
   2. Carlisle Corporation, Carlisle Coatings & Waterproofing Div.; CCW 701.
   3. Henry Company; Blueskin WP 100/200.
   4. ‘Tuff-n-Dri Waterproofing System’ by Tremco
   5. Substitutions subject to Division 01 Section “Product Requirements”

2.02 RUBBERIZED-ASPHALT SHEET WATERPROOFING

A. Rubberized-Asphalt Sheet: 60-mil-thick, self-adhering sheet consisting of 56 mils of rubberized asphalt laminated to a 4-mil-thick, polyethylene film with release liner on adhesive side.
   1. Tensile Strength: 250 psi minimum; ASTM D 412, Die C, modified.
   2. Ultimate Elongation: 300 percent minimum; ASTM D 412, Die C, modified.
   5. Puncture Resistance: 40 lbf minimum; ASTM E 154.
   7. Water Absorption: 0.15 percent weight-gain maximum after 48-hour immersion at 70 deg F; ASTM D 570.
   8. Vapor Permeance: 0.05 perms; ASTM E 96, Water Method.

2.03 AUXILIARY MATERIALS

A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
   1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.

B. Primer and/or Surface Conditioner: Liquid, waterborne or solvent-borne primer / surface conditioner recommended for substrate by manufacturer of sheet waterproofing material.
C. Sheet Strips: Self-adhering, rubberized-asphalt composite sheet strips of same material and thickness as sheet waterproofing.

D. Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes recommended by waterproofing manufacturer.

E. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch thick, predrilled at 9-inch centers.

2.04 OPTIONAL FLUID-APPLIED FOUNDATION WATERPROOFING

A. Application: At Contractor’s Option, in lieu of sheet waterproofing, under the following conditions and subject to Architect’s approval:
1. Project conditions are favorable to liquid application, due to foundation design, preparation requirements, construction sequencing, seasonal and environmental conditions,
2. Installed system complies with performance, quality control and warranty requirements specified in Part 1.

B. Initial Bid Price, Contract Sum, Schedule of Values and Combined Construction Schedule shall include specified sheet waterproofing. Approval of liquid-applied waterproofing shall be by Change Order to reduce the Contract Time, or Contract Sum, or both.

C. Product: Two-Component, Unreinforced, Latex-Rubber Waterproofing: Comply with ASTM C 836 and with manufacturer's written physical requirements.
   a. Basis of Design: Procor by W. R. Grace & Co

D. Auxiliary Materials: Provide auxiliary materials recommended by manufacturer to be compatible with one another and with waterproofing, as demonstrated by waterproofing manufacturer, based on testing and field experience.
   1. Primer: Manufacturer's standard, factory-formulated polyurethane or epoxy primer.
      a. Adhesive: Manufacturer's recommended contact adhesive.
   3. Joint Reinforcing Strip: Manufacturer's recommended fiberglass mesh or polyester fabric.
   4. Joint Sealant: Multicomponent polyurethane sealant, compatible with waterproofing, complying with ASTM C 920 Type M, Class 25; Grade NS for sloping and vertical applications or Grade P for deck applications; Use NT exposure; and as recommended by manufacturer for substrate and joint conditions.
      a. Backer Rod: Closed-cell polyethylene foam.

2.05 PROTECTION BOARD

A. Protection Course: At Contractor’s option provide one to the following types of protection board:
1. Semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners for 1/8 inch nominal thickness.
   a. Adhesive: Rubber-based solvent type recommended by waterproofing manufacturer for type of protection course.
2. Fan folded, with a core of extruded-poly styrene board insulation sandwiched between 2 sheets of plastic film, nominal thickness 1/4 inch, with compressive strength of 15 psi per ASTM D 1621 and maximum water absorption by volume of 0.4 percent per ASTM C 272.
2.06 MOLDED-SHEET DRAINAGE PANELS

A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Manufactured composite subsurface drainage panels consisting of a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to 1 side and a polymeric film bonded to the other side of a 3-dimensional, nonbiodegradable, molded-plastic-sheet drainage core, with a vertical flow rate of 9 to 15 gpm per ft.

2.07 INSULATION AND DRAINAGE PANELS

A. At Contractor’s option, with written approval by waterproofing installer and manufacturer, use one of the following systems over waterproofing membrane:

1. Protection board and molded-drainage panels with perimeter wall insulation specified in Section 07 2100.

2. Unfaced Wall Insulation Drainage Panel: Extruded polystyrene board insulation, min 1.1/2-in. thick, ASTM C 578 Type IV 25 psi min compressive strength, unfaced, fabricated with shiplap or channel edges and with groove drainage channels on inside face. Subject to compliance with requirements, provide one of the following or alternative as approved by Architect:
   a. Certifoam 25 by Diversifoam Products
   b. Perimate by Dow Chemical Company
   c. Green-Guard DC by Pactiv G Building Products.

END OF SECTION 07 1300
SECTION 07 2100 - THERMAL INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
1. Perimeter insulation under slabs-on-grade (extruded polystyrene).
2. Continuous rigid cavity-wall insulation.
3. Concealed fibrous building insulation
4. Concealed spray-foam building insulation/ air barrier

B. Related Sections include the following:
1. Division 04 Section "Unit Masonry" for insulation installed in masonry backup cavity walls.
2. Division 07 Sections for Membrane Roofing for insulation specified as part of low slope roofing construction.
3. Division 07 Section "Fire-Resistive Joint Systems" for insulation installed as part of a perimeter fire-resistive joint system.
4. Division 08 Section "Glazing" for insulation panel installed at spandrel glazing.
5. Divisions 22 and 23 Sections for insulation specified as part of plumbing and mechanical systems.

PART 2 - PRODUCTS

2.01 FOAM-PLASTIC BOARD INSULATION

A. Extruded-Polystyrene Board Insulation: ASTM C 578, of type and density indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively:
1. Manufacturers:
   a. DiversiFoam Products.
   b. Dow Chemical Company.
   c. Owens Corning.
2. Type IV, 1.60 lb/cu. ft., unless otherwise indicated.
   a. Basis of Design for cavity-wall board (masonry backup) and at metal wall cladding: Dow Cavity Mate Ultra R5.7
3. Type VII, 60 psi at below-ground applications
   a. Basis-of-Design: Dow Styrofoam Brand Highload 60 R10
   b. At slab perimeters provide a total installed width (horizontal plus vertical) of 4'-0 min.
   c. At subgrade wall perimeters, install as shown.
4. Polystyrene products will not be acceptable as masonry cavity insulation with studwall backup except as described in Division 04 Section “Unit Masonry”
2.02 CAVITY-WALL CONTINUOUS BOARD INSULATION

A. Basis of Design: Foil-Faced Glass-Fiber-Reinforced Polyisocyanurate Foam Insulation: ASTM C1289, Type I, Class 2, with compressive resistance 25 psi as per ASTM D1621.
1. Thermal Resistance: 5-year aged minimum R-value of 6.5 per inch.
2. Water Absorption: Maximum 0.05 percent by volume as per ASTM C 209.
3. Acceptable Products:
   b. Xci board by Hunter Panels

B. Fire Test Response Characteristics: Provide products tested, approved and appropriately labeled as follows:
1. ASTM E 84/ UL 723
   a. Flame Spread Index 25 or less (Class A)
   b. Smoke Developed Index 450 or less
2. Part of a tested and approved NFPA 285 wall assembly.
3. Products bearing on each piece the label of an approved agency, with manufacturer’s identifying information, performance characteristics, and approval agency’s identification.

C. Adhesive: Type recommended by insulation board manufacturer for application indicated, and compatible with air barrier membrane.

2.03 SPRAY-APPLIED FOAM INSULATION

1. Design R value minimum R 6 per inch.
2. Density of 1.9 pounds per cubic foot.
3. Smoke development not greater than 450 and flame spread not greater than 25 when tested in accordance with ASTM E 84.

B. Subject to compliance with requirements, provide one of the following:
1. Walltite US by BASF.
2. Heatlok SOY by Demilec (USA) LLC.
3. Thermalstop by NCFI Polyurethanes
4. Insulstar by NCFI Polyurethanes
5. Ecobay CC by Bayer MaterialScience LLC
6. Ecobay CC Polar 2.0 by Bayer MaterialScience LLC
7. Permax 2.0 by Henry
8. Corbond III by Johns Manville
9. Certaspray CC by CertainTeed Corporation
10. MD-C-200 by Icynene Inc

C. Transition Membrane Between Air Barrier Membrane and Adjacent Elements: Comply with both air barrier manufacturer’s recommendations and material manufacturer’s recommendations
1. CCW-705 TWF by Carlisle Coatings and Waterproofing.
4. Poly-Wall Crack Guard by Protective Coatings Technology, Inc.
5. ExoAir 110 by Tremco, Inc.
6. Air Shield by W. R. Meadows, Inc.
7. Subject to compliance with requirements: Product supplied by or acceptable to manufacturers of affected substrates.

2.04 GLASS-FIBER BLANKET INSULATION

A. Manufacturers:
   1. CertainTeed Corporation.
   2. Guardian Fiberglass, Inc.
   4. Knauf Fiber Glass.
   5. Owens Corning.

B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

C. Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type III (blankets with reflective membrane facing), Class A (membrane-faced surface with a flame-spread index of 25 or less); Category I (membrane is a vapor barrier), faced with polypropylene-scrim-kraft vapor-retarder membrane on 1 face.

D. Where glass-fiber blanket insulation is indicated by the following thicknesses, provide blankets in batt or roll form with thermal resistances indicated:
   1. 3-5/8 inches thick with a thermal resistance of 11 deg F x h x sq. ft./Btu at 75 deg F.
   2. 5-1/2 inches thick with a thermal resistance of 21 deg F x h x sq. ft./Btu at 75 deg F.

2.05 AUXILIARY INSULATING MATERIALS

A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by insulation manufacturers for sealing joints and penetrations in vapor-retarder facings.

B. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.

END OF SECTION 07 2100
SECTION 07 2417 – SYNTHETIC STUCCO CEILING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes composite soffit or ceiling finish system for moist or high-humidity areas.
   1. Ceiling in shower areas.
   2. Exterior soffit repair and patching.

B. Related Sections include the following:
   1. Division 07 Section "Polymer Based EIFS " for exterior soffits forming part of an insulating enclosure.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide compatible products by one of the following:
   1. Basis of Design: Sto Corp.
   2. Dryvit Systems, Inc.
   4. Sonneborn, Div. of ChemRex, Inc.
   5. TEC, an H. B. Fuller Company

2.02 CEILING FINISH SYSTEM MATERIALS

A. Acrylic-based, fiber reinforced, vapor permeable, flexible waterproofing membrane system applied as a veneer over substrate board applied to ceiling structure.
   1. Basis of Design: StoQuick Silver System I by Sto Corp
      a. StoMesh and StoGuard Mesh; manufacturer's standard open-weave glass fiber mesh
      b. Sto Flexyl; embedded acrylic, fiber-reinforced waterproof base coat
      c. Watertight Coat; flexible, permeable waterproof membrane
      d. Acrylic primer;
      e. Sto Essence DPR 306 Medium Sand or 301 Fine Sand finish coat.

2.03 WATER-RESISTIVE BARRIER

A. Grade D kraft building paper complying with UBC Standard 14-1 or Type 1, No 15, asphalt felt, complying with ASTM D 226, weighing not less that 14 pounds per 100 square feet, or a code approved equal.

2.04 PANEL PRODUCTS

A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated. At contractor's option, and subject to
specified requirements, and limitations of manufacturer's recommendations, provide cementitious backer boards.

B. Cementitious Backer Units: 1/2-inch thick, ANSI A118.9 or ASTM C 1325, in maximum lengths available to minimize end-to-end butt joints.
   1. Basis of Design Product: PermaBase® Brand Cement Board by National Gypsum Company
   2. Subject to compliance with requirements, provide Basis of Design product, or similar products by one of the following:
      a. C-Cure; C-Cure Board 990.
      b. Custom Building Products; Wonderboard.
      c. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
      d. USG Corporation; DUROCK Cement Board.

2.05 TRIM ACCESSORIES

A. Standard Trim: ASTM C 1047, provided or approved by manufacturer for use in gypsum applications indicated.
   1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc or Plastic.
   2. Shapes:
      a. Cornerbead.
      b. Bullnose bead.
      c. LC-Bead: J-shaped; exposed long flange receives joint compound.
      d. L-Bead: L-shaped; exposed long flange receives joint compound.
      e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
      f. Curved-Edge Cornerbead: With notched or flexible flanges.
      g. Control joints.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Fry Reglet Corporation.
      b. Gordon Inc.
      c. Pittcon Industries.
   2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.
   3. Finish: Manufacturer's standard prime paint finish.

2.06 SYSTEM COMPONENTS

A. Mechanical Fasteners
   1. Appropriate non-corroding fasteners, depending on the type framing or substrate:
      a. Steel Framing—minimum # 8 Type S-12 wafer head fully threaded corrosion resistant screws with minimum 3/8 inch penetration into studs.

B. Base Coat
   1. Cementitious Base Coat
      a. Sto Primer/Adhesive-B—one-component, polymer modified, cement based, factory blend base coat with less than 33% portland cement content by weight.
2. **Waterproof Base Coat**  
   a. **Sto Flexyl**—two component fiber reinforced acrylic based waterproof base coat mixed with Portland cement (for use as a waterproof base coat to waterproof foundations, splash areas, foam trim and other projecting foam architectural features).

C. **Reinforcing Meshes**  
   1. **Standard Mesh**  
      a. **Sto Mesh**—nominal 4.5 oz./yd² symmetrical, interlaced open-weave glass fiber fabric made with alkaline resistant coating for compatibility with Sto materials

   2. **Specialty Meshes**  
      a. **StoGuard™ Mesh**—nominal 4.2 oz/sq. yd., self-adhesive, flexible, symmetrical, interlaced glass fiber fabric, with alkaline resistant coating for compatibility with Sto materials.
      b. **Sto Detail Mesh**—nominal 4.2 oz/yd², flexible, symmetrical, interlaced glass fiber fabric, with alkaline resistant coating for compatibility with Sto materials.
      c. **Sto Corner Mat**—nominal 7.7 oz./yd², pre-creased, heavy-duty, open-weave woven glass fiber fabric with alkaline resistant coating for compatibility with Sto materials.

D. **Primer**: **Sto Primer**—acrylic based tinted primer.

E. **Finish Coat**:  
   1. **Interior**: **Sto Essence DPR Finish**—acrylic based textured wall finish with graded marble aggregate and dirt pick up resistance technology.
   2. **Exterior**: Compatible with and matching texture of existing construction, as recommended by Manufacturer and acceptable to Architect.

F. **Accessories**  
   1. **Basis of Design Manufacturer**: Plastic Components Inc, 800 327 7077
   2. **Starter Track**— **Starter TRAC** a rigid PVC (polyvinyl chloride) plastic track, Part No. STDE-50
   3. **Starter Track** (alternative) — **i Drip TRAC** a rigid PVC (polyvinyl chloride) plastic track, Part No. iDT-50
   4. **Starter Track** (alternative) — **Vent Screen TRAC** a rigid PVC (polyvinyl chloride) plastic track with double row of drainage holes, Part No. VST-50
   5. **Surface Mounted “L” Bead**— a rigid PVC (polyvinyl chloride) surface mounted “L” shaped bead for terminations, openings, etc, Part No. 2221-50
   6. **Casing Bead**— **CB Casing Bead** a rigid PVC (polyvinyl chloride) plastic accessory for sheathing termination points, Part No. CB-50-16
   7. **Corner Bead**— **Corner Bead** a rigid PVC (polyvinyl chloride) plastic accessory for smooth transitions at exterior corners, Part No. 2209
   8. **Control Joint**— **Control Joint** a rigid PVC (polyvinyl chloride) plastic accessory for designed control joints, Part No. 220027-16
   9. **Reveal Joint**— **DEFS Channel Joint** a rigid PVC (polyvinyl chloride) plastic accessory for architectural reveals up to 4 inches wide by 1/2 inch deep, Part Nos. 2225 thru 2239
G. Job Mixed Ingredients

2.07 JOINT REINFORCING MATERIALS

A. General: Comply with joint strength requirements in ASTM C 587 and with finish system manufacturer's written recommendations for each application indicated.

B. Joint Tape:
   1. Gypsum Base: As recommended by finish manufacturer for applications indicated.
   2. Cementitious Backer Units: As recommended by cementitious backer unit manufacturer.

C. Embedding Material for Joint Tape:
   1. Gypsum Base: As recommended by finish manufacturer for use with joint-tape material and gypsum veneer plaster applications indicated.
   2. Cementitious Backer Units: As recommended by cementitious backer unit manufacturer for applications indicated.

END OF SECTION 07 2417
SECTION 07 2726 - AIR BARRIERS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
1. Fluid-applied membrane air barrier assemblies, vapor permeable, at perimeter wall enclosure of new construction.
2. Continuity and performance of building air barrier system in new construction, and interface of air barrier system at existing construction.
   a. System continuity and performance includes penetration-sealing and appropriate transition accessories between various air barrier materials and assemblies.
3. Inspections and testing.

B. Services included:
1. Coordination among various Prime Contractors, proper scheduling and sequencing of Work, preconstruction meetings, inspections, tests and related actions, including reports performed by Contractors, by independent agencies, and by governing authorities.
   a. Services do not include contract enforcement activities performed by Architect and Construction Manager.
2. Each affected Contractor shall ensure that the intent of constructing the building enclosure with a continuous air barrier system to control air leaking into or out of the conditioned space is achieved. The air barrier system shall have the following characteristics:
   a. It must be continuous with all joints sealed
   b. It must be structurally supported to withstand positive and negative air pressures applied to the building enclosure.
   c. Connection shall be made between:
      1) Foundation and walls
      2) Walls and windows, doors, other openings
      3) Different wall systems
      4) Wall and roof
      5) Wall and roof over unconditioned space
      6) Walls, floor and roof across construction, control and expansion joints
      7) Walls, floors and roofs to utility, pipe and duct penetrations
3. Air Barrier Penetrations: All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made air-tight.
4. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
5. Requirements of this section relate to the coordination among the Prime Contractors and subcontractors required to provide an airtight building enclosure and customized fabrication and installation procedures. Includes:
   a. Continuity of the air barrier materials and products with joints to provide assemblies.
   b. Continuity of all the enclosure assemblies with joints and transition materials to provide a whole building air barrier system.
c. Specified inspections, tests and related actions do not limit Contractor’s quality-control procedures that facilitate compliance with Contract Document requirements.
d. Requirements for Contractor to provide an airtight building enclosure is not limited to quality-control services required by Architect, Owner, or authorities having jurisdiction.

C. Air Barrier System Summary:
1. Air Barrier Assembly at Roofing:
   a. Metal Roofing: Self-adhered membrane underlayment specified in Division 07.
   b. Membrane Roofing: Roofing membrane performs as air barrier assembly. No additional air barrier is specified.
2. Air Barrier Assembly at Perimeter Wall Enclosure:
   a. Masonry backup construction: Fluid-applied membrane specified in this Section.
   b. Insulating structural backup panel construction: Air-barrier performance is integral with panel design. No additional air barrier material is specified.
   c. Structural metal-stud backup construction: Spray-applied foam insulation performs as air-barrier assembly. No additional air barrier material is specified.
3. Air Barrier Continuity: Applications of accessory transition and penetration-sealing materials specified in this section, installed recommend by manufacturer and consistent with recommendations for system continuity in applicable ABAA Air Barrier specification.
   a. Self-adhering butyl and/or neoprene strips
   b. Self-adhering counter flashing strips
   c. Spray polyurethane foam sealant
   d. Preformed silicone-sealant extrusions
   e. Patching materials
   f. Mastic and sealants

D. Existing Construction:
1. Roof Enclosure: Existing membrane roof assemblies are presumed to be designed to resist air infiltration and exfiltration, but transitions and penetrations were not designed to meet the performance requirements of an air barrier assembly as specified herein.
2. Perimeter Enclosure: It is presumed that the existing perimeter enclosure construction does not comply with specified air leakage standards for new construction, and that air movement through the existing enclosure under normal differential pressures will remain un-controlled after completion of the current Project.
3. Transitions: Provide appropriate membrane or other compatible continuous means of transition between air and vapor barrier components of existing building enclosure, and new air barrier system.

E. Related Sections include the following:
1. Division 04 Section "Unit Masonry" for embedded flashings.
2. Division 05 Section “Structural Metal Stud Framing” for exterior stud wall sheathing.
3. Division 07 Sections for roofing assemblies for air-barrier performance of roofing membrane, or air-barrier membrane applied to roofing substrate.
4. Division 07 Section "Thermal Insulation" for spray-applied foam-plastic insulation used as air barrier material at metal stud backup system.
5. Division 07 Section “Fabricated Insulating Wall Panel System” for panelized insulating/ air barrier assembly at cavity wall.
6. Division 08 Sections for doors and windows
PART 2 - PRODUCTS

2.01 FLUID-APPLIED MEMBRANE AIR BARRIER

A. Fluid-Applied, Vapor-Permeable Membrane Air Barrier: Elastomeric, modified bituminous or synthetic polymer membrane. Provide Manufacturer's complete system, compatible with penetration flashing, sealants, and adjacent components air-barrier assembly specified in other Sections.
   1. Elastomeric Membrane:
      a. Henry Company; Air-Bloc 31.
      b. W.R.Meadows; Air-Shield LM
      c. Polyguard; Airlok Flex VP
      d. Carlisle Coatings & Waterproofing; Barritech VP.
      e. BASF Wall Systems; Enershield-HP
      f. Tremco Inc; ExoAir 220 Vapor Permeable
      g. Prosoco, R-Guard MVP
      h. Sto Corp; Sto Guard/ EmeraldCoat System

   2. Physical and Performance Properties:
      a. Membrane Air Permeance: Not to exceed 0.004 cfm/ sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
      b. Membrane Vapor Permeance: Not less than 10 perms; ASTM E 96.

2.02 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by air barrier manufacturer for intended use and compatible with air barrier. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Primer: Liquid waterborne primer recommended for substrate by manufacturer of air barrier material.

C. Counterflashing Strip: Modified bituminous 40-mil- thick, self-adhering sheet consisting of 32 mils of rubberized asphalt laminated to an 8-mil- thick, cross-laminated polyethylene film with release liner backing, or as otherwise recommended by air barrier manufacturer.

D. Butyl Strip: Vapor-retarding, 30- to 40-mil- thick, self-adhering; polyethylene-film-reinforced top surface laminated to layer of butyl adhesive with release liner backing, or as otherwise recommended by air barrier manufacturer.
   1. Application: transition air barrier to EPDM roofing membrane or flashing.

E. Termination Mastic: Cold fluid-applied elastomeric liquid; trowel grade.

F. Joint Reinforcing Strip: Air barrier manufacturer's glass-fiber-mesh tape.

G. Substrate Patching Membrane: Manufacturer's standard trowel-grade substrate filler.

H. Adhesive and Tape: Air barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.
I. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0187 inch thick, and Series 300 stainless-steel fasteners.

J. Sprayed Polyurethane Foam Sealant: 1- or 2-component, foamed-in-place, polyurethane foam sealant, 1.5 to 2.0 lb/cu. ft density; flame spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
   1. Application:
      a. Gaps at penetrations and openings.
      b. Roof/wall and floor/wall junctures
      c. Flute closures for metal roof deck perimeters and penetrations.
   2. Product: Froth-Pak Class A Polyurethane Spray Foam by Dow Building Solutions.

K. Transition Membranes, as recommended by air barrier manufacturer for specific application:
   1. Adhesive-Coated Transition Strip: Vapor-permeable, 17-mil- thick, self-adhering strip consisting of an adhesive coating over a permeable laminate with a permeance of 37 perms.
   2. Elastomeric Flashing Sheet: ASTM D 2000, 2BC415 to 3BC620, minimum 50- to 65-mil-thick, cured sheet neoprene with manufacturer's recommended contact adhesives and lap sealant with stainless-steel or aluminum termination bars and stainless-steel fasteners.
   3. Preformed Silicone-Sealant Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.
      a. 123 Silicone Seal by Dow Corning Corporation
      b. UltraSpan US1100 by GE Silicones
      c. Sil-Span by Pecora Corporation
      d. Spectrem EZ Seal by Tremco Incorporated

L. Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low-modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O. Comply with Division 07 Section "Joint Sealants."

END OF SECTION 07 2713
SECTION 07 4214 - FORMED METAL WALL PANELS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Exposed-fastener, prefinished horizontal tapered-rib aluminum exterior wall cladding.

PART 2 - PRODUCTS

2.01 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.

1. Aluminum Sheet: Coil-coated sheet, ASTM B 209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
   a. Thickness: as indicated.

2. Exterior Finish: Two-coat fluoropolymer.
   a. Basis of Design: KYNAR 500 PDVF or HYLAR 5000
   b. Surface: Smooth, flat finish.

3. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored backer finish.

2.02 CONCEALED/EXPOSED-FASTENER, TAPERED-RIB METAL WALL PANELS

A. General: Provide factory-formed metal panels designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps. Include accessories required for weathertight installation.

1. Sheet Thickness:
   a. 0.050 from grade to 10 ft above grade
   b. 0.032 above 10 ft.


B. Wide-Rib, Clipless Concealed-Fastener Metal Wall Panels: Formed with slightly tapered panel rib edges, a flat pan between panel rib edges, and wide reveal joint between ribs.

1. Basis-of-Design Product: ATAS Belvedere BWR360Panel
2. Panel Coverage: 36 inches.
3. Panel Height: 1.5 inches.
4. Color: As scheduled on Drawings or otherwise approved by Architect.

C. Other manufacturers of similar products, subject to compliance with requirements and Architect’s written approval:

1. CENTRIA Architectural Systems.
2. Una-Clad/ Firestone
3. Metal Sales Manufacturing Corporation.
4. Morin; a Kingspan Group company.
5. Petersen Aluminum Corporation.
2.03 ACCESSORY MATERIALS

A. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, Mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

1. Closures: Provide closures fabricated of same metal as metal panels.
2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

B. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

1. Trim profiles shall be as detailed on Architectural Drawings

C. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

D. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.

2.04 FABRICATION

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

1. Panels, fabrication and installation shall meet the requirements of the Metal Construction Association Preformed Metal Wall Guidelines
2. Form all components true to shape, accurate in size, square and free from distortion or defects. Cut panels to precise lengths indicated on approved shop drawings or as required by field conditions.
3. Accessories: Factory fabricate trim and flashing components in standard 12-foot lengths, min.
4. Form panel lines, breaks, and angles to be sharp and true, with surfaces free from warp and buckle.

5. Fabricate wall panels as required to maintain fabrication tolerances and to withstand design loads.

B. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

C. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
   1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
   3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
   4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.

2.05 FINISHES

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

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

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.06 SUBSTRATE

A. Concealed Plywood: Exterior or Exposure 1 sheathing, span rating to suit framing in each location, and thickness as indicated but not less than 1/2 inch.

B. Substrate-Board Fasteners: Factory-coated steel fasteners and metal plates complying with corrosion-resistance provisions in FMG 4470, designed for fastening substrate board to substrate.

C. Weather-Resistive Barrier: Sheet building wrap, ASTM E 1677 Type I permeable weather barrier system with flexible flashings, penetration sealants, transitions, and other accessories.
   1. ASTM E 1677 Type I permeable weather barrier system and related assembly components
      a. DuPont; Tyvek Commercial Wrap.
b. Ludlow Coated Products; Barricade Building Wrap.
c. Pactiv, Inc.; GreenGuard C500 Building Wrap
d. Raven Industries Inc.; Fortress Pro Weather Protective Barrier.
e. Reemay, Inc.; Typar HouseWrap.

2. Water-Vapor Permeance: Not less than 23 perms per ASTM E 96, Desiccant Method (Procedure A).

3. Water Penetration Resistance: 210 cm when tested in accordance with AATCC Test Method 127.


5. Allowable UV Exposure Time: Not less than three months.


7. Contractor’s Option: Sheet-applied vapor permeable microporous laminate water-resistive membrane system, meeting requirements of ASTM E-2357
   a. Henry BlueskinVP 160 in conjunction with manufacturer-recommended self-adhered transition membranes, primer and HE925 BES Sealant at terminations and penetrations, or similar products, subject to compliance with requirements, by one of the following:
      1) Carlisle Coatings and Waterproofing.
      2) Grace Construction Products.
      3) Tremco, Inc.
      4) W. R. Meadows, Inc.

8. Application: Drainage plane covering exterior surface of wood substrate board and draining to the exterior, in conjunction with flashing and other installation accessories as recommended or supplied by Manufacturer. Building wrap weather barrier is not part of air barrier system.

END OF SECTION 07 4214
SECTION 07 4243 - COMPOSITE METAL PANELS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes prefinished aluminum composite wall panel systems.
   1. Rout & Return Composite Metal Wall Panel assemblies; clip-attached, wet-seal (barrier) type.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide basis-of-design products by Laminators Inc. or similar products, subject to prior approval, by one of the following:
   1. 3A Composites USA Inc.; Alucobond Plus
   2. Alcoa Inc.; Reynobond FR.
   3. CENTRIA Architectural Systems; Formabond Wall System.

2.02 PANEL MATERIALS

A. Aluminum Sheet: Coil-coated sheet, ASTM B 209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
   1. Surface: Smooth, flat finish.
   2. Exposed Coil-Coated Finishes:
      a. Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 50 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   3. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

B. Panel Sealants:
   1. Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal-faced composite wall panels and remain weathertight; and as recommended in writing by panel manufacturer.
   2. Color: as scheduled or as otherwise approved by Architect to match aluminum finish.
2.03 MISCELLANEOUS MATERIALS

A. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for type of use and finish indicated.

B. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal-faced composite wall panels by means of plastic caps or factory-applied coating. Provide EPDM, PVC, or neoprene sealing washers.

2.04 METAL-FACED COMPOSITE WALL PANELS

A. General: Provide factory-formed and -assembled, metal-faced composite wall panels fabricated from two metal facings bonded, using no glues or adhesives, to solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment system components and accessories required for weathertight system.

1. Fire-Retardant Core: Noncombustible, with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
   a. Flame-Spread Index: 25 or less.
   b. Smoke-Developed Index: 450 or less.

2. Basis-of-Design Products:

B. Attachment System Components: Formed from material compatible with panel facing.
   1. Include manufacturer's standard panel stiffeners.

2.05 ACCESSORIES

A. Wall Panel Accessories: Provide components required for a complete metal-faced composite wall panel assembly including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal-faced composite wall panels unless otherwise indicated.

B. Flashing and Trim: Formed from 0.018-inch minimum thickness, zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal-faced composite wall panels.
2.06 FABRICATION

A. General: Fabricate and finish metal-faced composite wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Fabricate metal-faced composite wall panels in a manner that eliminates condensation on interior side of panel and with joints between panels designed to form weathertight seals.
   1. Trim and square edges of sheets with no displacement of face sheets or protrusion of core material.
   2. Form panel lines, breaks, and angles to be sharp and true, with surfaces free from warp and buckle.
   3. Fabricate panels with sharply cut edges, with no displacement of face sheets or protrusion of core material.
   4. Rout & Return Composite Metal Wall Panel:
      a. Fabricate panels with panel stiffeners, as required to comply with deflection limits, attached to back of panels with structural silicone sealant or bond tape.

C. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
   1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
   3. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
   4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
   5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal-faced composite wall panel manufacturer.
      a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal-faced composite wall panel manufacturer for application, but not less than thickness of metal being secured.
2.07 \hfill GENERAL FINISH REQUIREMENTS

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

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

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Where scheduled on Drawings, provide AAMA 2605 3-coat thermocured system consisting of primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight.

END OF SECTION 07 4243
SECTION 07 5216 - MODIFIED BITUMINOUS MEMBRANE ROOFING (ALTERNATE Bid)

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Modified Bituminous Membrane Roofing, 2-ply cold-applied process with 1-ply base sheet and mineral granule cap sheet.
      a. Styrene-butadiene-styrene (SBS) modified bituminous membrane
   2. Roof insulation.
   3. Design and Engineering requirements for wind-load resisting systems.

B. Related Sections:
   1. Division 01 Section "Execution" for specific requirements regarding cutting and patching.
   2. Division 06 Section "Miscellaneous Rough Carpentry" for wood nailers, cants, curbs, and blocking.
   3. Division 07 Sections for roof trim and accessories, roof penetration flashings, flashings, and counterflashings.

PART 2 - PRODUCTS

2.01 MODIFIED BITUMINOUS ASPHALT SHEET MATERIALS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Firestone Building Products Company
   2. GAF Materials Corporation.
   5. Performance Roof Systems, Inc.
   6. Siplast, Inc.
   7. Soprema, Inc.
   8. Tremco Inc.

B. Roofing Membrane Sheet:
   1. ASTM D 6163, Grade S, Type I or II, SBS-modified asphalt sheet (reinforced with glass fibers); smooth surfaced; suitable for application method specified.

C. Granule-Surfaced Roofing Membrane Cap Sheet:
   1. ASTM D 6162, Grade G, Type I or II, SBS-modified asphalt sheet (reinforced with a combination of polyester fabric and glass fibers); granular surfaced; suitable for application method specified, and as follows:
   2. Granule Color: As selected by Architect from manufacturer's full range.
D. Metal-Foil-Surfaced Roofing Membrane Cap Sheet: ASTM D 6298, metal-foil surfaced SBS-modified asphalt sheet (reinforced with glass fibers); suitable for application method specified, and as follows:
   1. Foil Surfacing: Aluminum.

2.02 BASE FLASHING SHEET MATERIALS

A. Backer Sheet:
   1. ASTM D 6164 or ASTM D 6162, Grade S, Type I or II, polyester-reinforced or combination polyester- and fiberglass-reinforced, SBS-modified asphalt sheet; smooth surfaced; suitable for application method specified.

B. Flashing Sheet:
   1. ASTM D 6164 or ASTM D 6162 (reinforced with polyester fabric or a combination of polyester fabric and glass fibers,) Grade G, Type I or II, polyester-reinforced, SBS-modified asphalt sheet; granular surfaced; suitable for application method specified, and as follows:

C. Metal-Foil-Surfaced Flashing Sheet: ASTM D 6298, metal-foil surfaced SBS-modified asphalt sheet (reinforced with glass fibers); suitable for application method specified, and as follows:
   1. Foil Surfacing: Aluminum

2.03 AUXILIARY ROOFING MEMBRANE MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing membrane.
   1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
   2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
      a. Plastic Foam Adhesives: 50 g/L.
      b. Gypsum Board and Panel Adhesives: 50 g/L.
      c. Multipurpose Construction Adhesives: 70 g/L.
      d. Fiberglass Adhesives: 80 g/L.
      e. Contact Adhesive: 80 g/L.
      f. Other Adhesives: 250 g/L.
      g. Nonmembrane Roof Sealants: 300 g/L.
      h. Sealant Primers for Nonporous Substrates: 250 g/L.
      i. Sealant Primers for Porous Substrates: 775 g/L.
   3. Adhesives and sealants that are not on the exterior side of weather barrier 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."

B. Asphalt Primer: ASTM D 41.

C. Roofing Asphalt: ASTM D 312, Type IV, or as recommended by roofing system manufacturer for specified application and performance.
D. Cold-Applied Adhesive: Roofing system manufacturer's standard asphalt-based, one- or two-part, asbestos-free, cold-applied adhesive specially formulated for compatibility and use with roofing membrane and base flashings.

E. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.

F. Mastic Sealant: Polyisobutylene, plain or modified bitumen; nonhardening, nonmigrating, nonskinning, and nondrying.

G. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel bars, approximately 1 by 1/8 inch thick; with anchors.

H. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roofing membrane components to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.

I. Metal Flashing Sheet: As specified in Division 7 Section "Sheet Metal Flashing and Trim."

J. Roofing Granules: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 sieve and 98 percent of mass retained on No. 40 sieve, color to match roofing membrane.

K. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.

2.04 ROOF INSULATION

A. General: Use one type of specified insulation acceptable to roofing system manufacturer and compatible with roofing system.
   1. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, 1.6-lb/cu. ft. minimum density, square edged.
   2. Molded-Polystyrene Board Insulation: ASTM C 578 Type IX, 1.8-lb/cu. ft. minimum density.
   3. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces.

B. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches, unless otherwise indicated or approved.

C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.05 INSULATION ACCESSORIES

A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.
C. Cold Fluid-Applied Adhesive:
   1. Modified Asphaltic Insulation Adhesive: Insulation manufacturer's recommended modified asphaltic, asbestos-free, cold-applied adhesive formulated to attach roof insulation to substrate or to another insulation layer.
   2. Bead-Applied Insulation Adhesive: Insulation Manufacturer's recommended bead-applied, low-rise, one-component or multicomponent urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.
   3. Full-Spread Applied Insulation Adhesive: Insulation manufacturer's recommended spray-applied, low-rise, two-component urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.

D. Tapered Edge Strips and Insulation Cant Strips: ASTM C 728, perlite insulation board or ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board, as acceptable to roofing system manufacturer.

E. Insulation Cant Strips: ASTM C 728, perlite insulation board or ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.

F. Tapered Edge Strips: ASTM C 728, perlite insulation board ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.

G. Wood Nailer Strips: Comply with requirements in Division 06 Section "Miscellaneous Rough Carpentry."

A. Cover Board/Re-cover board: Provide one of the following:
   1. ASTM C 1177, glass-mat, water-resistant gypsum substrate, 1/2 inch thick, factory primed.
      a. Georgia-Pacific Corporation; Dens Deck Prime.
   2. ASTM C 1278, cellulosic-fiber reinforced, water-resistant gypsum substrate, 1/2 inch thick.
      a. USG Corporation; Securock.

2.06 AIR BARRIER CONTINUITY

A. General: Adhered roofing membrane and flashings will serve as part of air barrier system for building enclosure. Coordinate transitions to and interface with wall air barrier components at roof perimeters to provide continuity of air barrier system.

B. Auxiliary Materials: Provide products and methods recommended by air barrier manufacturer and roofing membrane manufacturer for intended use and compatible with roofing system and building's air barrier system. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
   1. Primer: Liquid waterborne primer recommended for substrate by manufacturer of air barrier material.
   2. Counter flashing Strip: Modified bituminous 40-mil-thick, self-adhering sheet consisting of 32 mils of rubberized asphalt laminated to an 8-mil-thick, crosslaminated polyethylene film with release liner backing.
      a. Application: counterflash metal flashings
   3. Butyl Strip: Vapor-retarding, 30- to 40-mil-thick, selfadhering; polyethylene-film-reinforced top surface laminated to layer of butyl adhesive with release liner backing.
      a. Application: Transition to roofing membrane
4. Termination Mastic: Cold fluid-applied elastomeric liquid; trowel grade.
5. Substrate Patching Membrane: Manufacturer's standard trowel-grade substrate filler.
6. Adhesive and Tape: Air barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.
7. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0187 inch thick, and Series 300 stainless-steel fasteners.
8. Sprayed Polyurethane Foam Sealant: 1- or 2-component, foamed-in-place, polyurethane foam sealant, 1.5 to 2.0 lb/cu. ft density; flame spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
   a. Application: gaps at penetrations and openings
9. Transitions, as recommended by manufacturer for specific application, and compatible with adjacent materials:
   a. Modified Bituminous Transition Strip: Vapor-retarding, 40-mil- thick, smooth-surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil- thick polyethylene film with release liner backing.
   b. Preformed Silicone-Sealant Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.
10. Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low-modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O. Comply with Division 07 Section "Joint Sealants."

END OF SECTION 07 5216
SECTION 07 5323 – ELASTOMERIC MEMBRANE ROOFING (BASE Bid)

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:
   1. Black, fully adhered ethylene propylene diene polymer (EPDM) membrane roofing system, including Roof Insulation, and Installation Accessories.
   2. Design and Engineering requirements for wind-load resisting systems.

B. Related Sections include the following:
   1. Division 01 Section "Execution" for specific requirements regarding cutting and patching.
   2. Division 05 Section "Steel Decking" for deck conditions affecting roofing performance.
   3. Division 06 Section "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
   4. Division 07 Section "Air Barriers" for additional information related to continuity of air barrier system.
   5. Division 07 Section "Joint Sealants" for joint sealants, joint fillers, and joint preparation.
   6. Other Division 07 Sections for roof trim and accessories, roof penetrations and flashings, metal flashings and counterflashings.
   7. Divisions 22 through 28 Sections for roof drains, rooftop equipment and other roof penetrations.

PART 2 - PRODUCTS

2.01 EPDM ROOFING MEMBRANE

A. Roofing Membrane: ASTM D 4637, Type I, non-reinforced uniform, flexible sheet made from ethylene propylene diene polymer, and as follows:
   2. Subject to compliance with requirements, provide products similar to the basis-of-design products by one of the following manufacturers.
      a. Firestone Building Products Company.
      b. Versico Incorporated.
      c. Johns Manville
   3. Exposed Face Color: Black.

2.02 AUXILIARY MATERIALS

A. General: Auxiliary materials are to be products of or accepted by roofing system manufacturer for intended use and compatible with membrane roofing.
   1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Sheet Flashing: 60-mil-thick EPDM, partially cured or cured, according to application, or as otherwise required by manufacturer for specified warranty.
C. Protection Sheet: Epichlorohydrin or neoprene non-reinforced flexible sheet, 55- to 60-mil- thick, recommended by EPDM manufacturer for resistance to hydrocarbons, non-aromatic solvents, grease, and oil.

D. Bonding Adhesive: Manufacturer's standard bonding adhesive.

E. Seaming Material: Manufacturer's standard warranted synthetic-rubber polymer primer and 3-inch-wide minimum, butyl splice tape with release film.

F. Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.

G. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

H. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

I. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.

J. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

K. Miscellaneous Accessories: Provide lap sealant, water cutoff mastic, metal termination bars, metal battens, pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

2.03 ROOF INSULATION

A. General:
1. Use one type of specified insulation acceptable to roofing system manufacturer and compatible with roofing system.

2. Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat face on both major surfaces.

C. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, 1.6-lb/cu. ft. minimum density, square edged.
   1. Dow Chemical Company Deckmate Plus.
   2. Owens Corning Foamular.
   3. Tenneco Building Products.
   4. DiversiFoam Products.

D. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slopes 1/4 inch per 12 inches, unless otherwise indicated.

E. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.
2.04 INSULATION ACCESSORIES

A. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

B. Cold Fluid-Applied Modified Asphaltic Insulation Adhesive: Insulation manufacturer's recommended modified asphalt, asbestos-free, cold-applied adhesive formulated to attach roof insulation to substrate or to another insulation layer.

C. Bead-Applied Insulation Adhesive: Insulation manufacturer's recommended bead-applied, low-rise, one- or multicomponent urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.

D. Full-Spread Applied Insulation Adhesive: Insulation manufacturer's recommended spray-applied, low-rise, two-component urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.

E. Cover Board: Provide one of the following:
   1. ASTM C 1177, glass-mat, water-resistant gypsum substrate, 1/4 inch thick, factory primed.
      a. Georgia-Pacific Corporation; Dens Deck Prime.
   2. ASTM C 1278, cellulosic-fiber reinforced, water-resistant gypsum substrate, 1/4 inch thick.
      a. USG Corporation; Securock.

F. Roofing Asphalt: ASTM D 312, Type III or IV.

2.05 AIR BARRIER CONTINUITY

A. General: Adhered roofing membrane and flashings will serve as part of air barrier system for building enclosure. Coordinate transitions to and interface with wall air barrier components at roof perimeters to provide continuity of air barrier system.

B. Auxiliary Materials: Provide products and methods recommended by air barrier manufacturer and roofing membrane manufacturer for intended use and compatible with roofing system and building's air barrier system. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
   1. Primer: Liquid waterborne primer recommended for substrate by manufacturer of air barrier material.
   2. Counterflashing Strip: Modified bituminous 40-mil- thick, self-adhering sheet consisting of 32 mils of rubberized asphalt laminated to an 8-mil- thick, crosslaminated polyethylene film with release liner backing.
      a. Application: counterflash metal flashings
   3. Butyl Strip: Vapor-retarding, 30- to 40-mil- thick, selfadhering; polyethylene-film-reinforced top surface laminated to layer of butyl adhesive with release liner backing.
      a. Application: Transition to roofing membrane
   4. Termination Mastic: Cold fluid-applied elastomeric liquid; trowel grade.
   5. Substrate Patching Membrane: Manufacturer's standard trowel-grade substrate filler.
6. Adhesive and Tape: Air barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.

7. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0187 inch thick, and Series 300 stainless-steel fasteners.

8. Sprayed Polyurethane Foam Sealant: 1- or 2-component, foamed-in-place, polyurethane foam sealant, 1.5 to 2.0 lb/cu. ft density; flame spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
   a. Application: gaps at penetrations and openings

9. Transitions, as recommended by manufacturer for specific application, and compatible with adjacent materials:
   a. Modified Bituminous Transition Strip: Vapor-retarding, 40-mil- thick, smooth-surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil- thick polyethylene film with release liner backing.
   b. Preformed Silicone-Sealant Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.

10. Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low-modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O. Comply with Division 07 Section "Joint Sealants."

2.06 DECK-TYPE ROOF EXPANSION ASSEMBLIES

A. Extruded Bellows Roof Expansion Joint: Manufactured, continuous, waterproof, joint-cover assembly; consisting of primary and secondary, single-layered, elastomeric seals; secured along each edge with extruded-aluminum retainers for fastening to substrate. Provide each size and type indicated, factory-fabricated units for corner and joint intersections and horizontal and vertical transitions including those to other building expansion joints, splicing units, adhesives, and other components as recommended by roof-expansion-joint manufacturer for complete installation. Fabricate each assembly specifically for installation configuration indicated on Drawings.
   3. Primary Seal: Elastomeric extrusion; color: Black.
   4. Equip secondary seal with drain tubes and seals to direct collected moisture to drain.

B. Contractor’s Option: Subject to compliance with requirements and membrane Manufacturer’s system warranty, in lieu of cant-mounted extruded bellows assembly, provide manufacturer’s standard components and assemblies consisting of membrane flashing over resilient expansion joint support or sponge tubing and compressible joint filler, installed per Manufacturer’s recommendations.
   1. Refer to current typical installation notes and details No U-3A and U-3B by Carllysle SynTec.
2.07  WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads or rolls, approximately 5/16 inch-thick, and acceptable to membrane roofing system manufacturer.
   1. Do not use roll material such that installation will inhibit free drainage of water, or enable water to drain across the surface of walkway, or enable ponding or damming of water on roofing membrane.

END OF SECTION 07 5323
SECTION 07 7100 - MANUFACTURED ROOF SPECIALTIES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes:
   1. Prefinished metal copings
   2. Roof edge flashing and trim.
   3. Metal gutters and downspouts
   4. Manufactured reglets and flashings.
   5. Custom-Formed flashing and trim.
   6. Penetration Flashing
   7. Miscellaneous materials and accessories

B. Related Sections:
   1. Coordinate with Division 04 Section "Unit Masonry" for installing through-wall flashing, reglets, and other sheet metal flashing and trim.
   2. Division 06 Section “Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
   3. Division 07 Section "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.
   4. Division 07 Sections for roof membrane assemblies for installing sheet metal flashing and trim integral with roofing membrane.

PART 2 - PRODUCTS

2.01 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.

2.02 MANUFACTURERS

A. Exposed prefinished aluminum roofing specialties: Provide Basis-of-Design products indicated, or comparable products, subject to specified requirements, by one of the following:
   1. ATAS International, Inc.
   2. Carlisle Syntec Systems
   4. Merchant and Evans, Inc
   5. Metal-Era, Inc.
   7. Petersen Aluminum Corp.
   8. W. P. Hickman Company.
2.03 MATERIALS

A. Aluminum Sheet: ASTM B 209, Alloy 3003, 3004, 3105, or 5005, Temper suitable for forming and structural performance required, but not less than H14, finished as follows:
   2. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
      a. Fluoropolymer 2-Coat System: Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605. Specified finish is minimum requirement. Provide greater quality finish if required to comply with manufacturer's requirements for specified warranty.

B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:
   1. Exposed High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
      a. Two-Coat Fluoropolymer: AAMA 2605. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
      b. Specified finish is minimum requirement. Provide greater quality finish if required to comply with manufacturer's requirements for specified warranty.

C. Provide colors as scheduled and approved by Architect

D. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

E. Zinc-Tin Alloy-Coated Stainless-Steel Sheet: ASTM A 240, Type 304, dead-soft, fully annealed stainless-steel sheet, coated on both sides with a zinc-tin alloy (50 percent zinc, 50 percent tin).
   1. Product: Subject to compliance with requirements, provide "TCS II" by Follansbee Steel.

F. Sealants:
   2. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
   3. Joint Sealant: ASTM C 920; silicone sealant; of type, grade, class, and use classifications required to seal joints in metal roof panels and remain weathertight; and as recommended in writing by metal roof panel manufacturer.
2.04 CONCEALED METALS

A. Aluminum Sheet: ASTM B 209, alloy and temper recommended by manufacturer for use and structural performance indicated, mill finished.

B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.

C. Zinc-Tin Alloy-Coated Stainless-Steel Sheet: ASTM A 240, Type 304, dead-soft, fully annealed stainless-steel sheet, coated on both sides with a zinc-tin alloy (50 percent zinc, 50 percent tin), with factory-applied gray preweathering.
   1. Product: Subject to compliance with requirements, provide "TCS II" by Follansbee Steel.

D. Stainless-Steel Sheet: ASTM A 240 or ASTM A 666, Type 304, dead soft, fully annealed. Finish 2B dull, cold rolled.

E. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653, G90 coating designation; structural quality.

2.05 UNDERLAYMENT MATERIALS

A. Felts: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
   1. Application: For use over wood blocking or sheathing, or as recommended by roof-specialty manufacturer.

B. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
   2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F.
   3. Products: Subject to compliance with requirements, provide one of the following:
      a. Carlisle Coatings & Waterproofing; CCW WIP 300HT.
      c. Henry Company; Blueskin PE200 HT.
      d. Metal-Fab Manufacturing, LLC; MetShield.
      e. Owens Corning; WeatherLock Metal High Temperature Underlayment.

C. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft.
   1. Application: For use over dissimilar substrate materials, as recommended by roof-specialty manufacturer.

2.06 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Flashing and Trim: Formed and prepainted with coil coating, minimum 0.018 inch thick. Provide flashing and trim as shown, and as otherwise required to seal against weather and to provide finished appearance.
C. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to withstand design loads.
   1. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.
   2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
   3. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.
   4. Solder for Zinc-Tin Alloy-Coated Stainless Steel: ASTM B 32, 100 percent tin.

D. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.

E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane or silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant (for movement joints): ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.

G. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

H. Splash Pans: Fabricate and pre-cast from concrete for 4000 psi concrete.

2.07 FABRICATION

A. General:
   1. Fabricate and finish metal panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
   2. Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
   3. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

B. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
   2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams and solder.

C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
D. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric or butyl sealant concealed within joints.
   1. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
   2. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal roof panel manufacturer.
      a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal roof panel manufacturer for application but not less than thickness of metal being secured.

2.08 FINISHES, GENERAL

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

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

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.09 COPINGS

A. Copings: Manufactured coping system consisting of formed-metal coping cap in section lengths not exceeding 12 feet, concealed anchorage, concealed splice plates with same finish as coping caps, mitered corner units, custom-formed fascia extenders (where indicated), and end cap units.
   1. Basis-of-Design Product: Snap-Tight Coping System and Peaked Snap-Tight Coping, by Architectural Products Co., or a comparable product, subject to specified requirements, by an approved manufacturer.
   2. Formed Aluminum: Thickness shall be determined by manufacturer based on face dimensions and to comply with specified performance, however minimum thickness shall be 0.050 inches for coping, 0.040 inches for custom fascia extenders.
   3. Coping Cap and Fascia Color: As scheduled and approved by Architect.
   4. Standard Shapes, Factory-Fabricated and Continuously Welded:
      a. Corners: Continuously welded inside and outside corners with 24-inch minimum nominal horizontal face dimension on long side.
      b. End Cap: End face matching front face with drip, factory welded at all joined edges.
      c. End Termination: Integral high-wall flange continuously factory-welded to top and faces of coping for installation under high-wall counter-flashing.
   5. Custom Shapes: Provide custom-formed fascia extenders matching profiles shown on Drawings. At vertical returns at bottom of fascia piece, form a drip edge.
      a. Application: Under coping at top of parapet walls; Fascia cladding under eave and rake trim at metal roof.
   6. Snap-on Coping Anchor Plates: Concealed, galvanized steel sheet, 12 inches wide, 0.028 inch thick, with integral cleats.
      a. Wood nailer not required at top of masonry parapet.
B. Subject to compliance with requirements and Architect’s approval, coping caps, shapes, and accessories that have been shop-formed and welded from prefinished coil may be used in lieu of manufactured products.

2.10 ROOF EDGE FLASHINGS

A. Roof Edge Fascia: Manufactured, two-piece, roof edge fascia consisting of compression-clamped metal fascia cover in section lengths not exceeding 12 feet and a continuous formed galvanized steel sheet cant dam, 0.028 inch thick, minimum, with integral drip edge cleat. Provide matching mitered and welded corner units.

1. Basis-of-Design Product: Fascia Systems XP and Galvanized Water Dam System by Architectural Products Co., or a comparable product, subject to specified requirements, by approved coping manufacturer.

2. Fascia Cover: Fabricated from the following exposed metal:
   a. Extruded Aluminum: Thickness shall be determined by manufacturer based on face dimensions and to comply with specified performance, however minimum thickness shall be 0.075 inches.

3. Fascia Cover Color: As scheduled and approved by Architect.


5. Splice Plates: Concealed, of same material, finish, and shape as fascia cover.

6. Provide pre-formed covers, closures and transitions to maintain continuity of waterproofing and integrity of flashing at inside and outside corners, building and roof expansion joints, abutting parapets and high walls, drainage scuppers, and other roof-edge conditions.

B. Shop-formed sheet metal components may not be substituted for manufactured extruded products.

2.11 COUNTERFLASHINGS AND REGLETS

A. Basis-of-Design Product: MA and ST/STX type Reglet Frame and Counterflash system, including s/stl clips, factory fabricated mitered and welded corners by Fry Reglet Corporation

1. Where masonry reglet receiver is to be embedded within mortar joint of face wythe, as part of through-wall flexible cavity flashing assembly, provide metal profile with no vertical leg at inside edge of top (embedded) flange.
   a. Contractor’s option, subject to compliance with requirements: In lieu of embedded masonry reglet/ flexible cavity flashing, provide through-wall stainless steel flashing, 0.015 in (28 ga) with deformed mechanical keys (ribs) at 3-inch intervals, manufactured with snaplock receiver, compatible with stainless steel counterflushing, on exterior face. Provide pre-formed corners and end dams. Acceptable alternative products:
      2) Dovetail or Sawtooth Flashing by Cheney Flashing Company
      3) STF Sawtooth Flashing by Hohmann & Barnard, Inc
      4) Pre-Formed Metal Flashing by Sandell Manufacturing Company.

2. Acceptable manufacturers of similar products or custom fabrications, subject to specified requirements:
   a. Cheney Flashing Company
   b. Heckmann Building Products Inc.
c. Hohmann & Barnard, Inc  
d. Keystone Flashing Company, Inc  
e. Metal-Era, Inc.  
f. Sandell Manufacturing Company, Inc

B. Counterflash: Manufactured units of heights to overlap top edges of base flashings by 4 inches and in lengths not exceeding 12 feet designed to snap into reglets or through-wall-flashing receiver and compress against base flashings with joints lapped, from the following exposed metal:
1. Zinc-Tin Alloy-Coated Stainless Steel: 0.019 inch thick.

C. Reglet (Receiver): Manufactured units formed to provide secure interlocking of separate reglet and counterflash pieces, and compatible with flashings indicated, from the following exposed metal:
1. Zinc-Tin Alloy-Coated Stainless Steel: 0.019 inch thick.
2. Corners: Factory mitered and continuously welded.
3. Surface-Mounted Type: Provide reglets with slotted holes for fastening to substrate, termination bar, neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
4. Masonry Type, Embedded: Provide reglets with offset horizontal top flange for embedment in masonry mortar joint, to receive fully adhered flexible thru-wall flashing.

D. Accessories:
1. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflash or where reglet is provided separate from metal counterflash.
2. Counterflash Wind-Restraint Clips: Provide clips to be installed before counterflash to prevent wind uplift of counterflash lower edge.

2.12 METAL GUTTERS AND DOWNSPOUTS

A. General:
1. Provide factory-formed box products designed to be field applied and mechanically attached to supporting construction using blind nailing. Include accessories required for complete installation.
   a. If construction at some locations does not permit blind nailing, provide countersunk nail heads concealed with putty filler of color to match molding finish.
2. Fabricate in minimum length sections indicated, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Provide wire ball strainers of compatible metal at outlets.
3. Subject to compliance with requirements and Architect’s approval, gutters and downspouts shop-formed or field-formed from prefinished coil may be used in lieu of manufactured products.
B. Hanging Gutters: Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories as required. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters.
   1. Gutter Style: SMACNA rectangular gutter design Style I or J.
   2. Material:
      a. Up to 15-inch girth, fabricate from roll-formed 0.032-inch thick aluminum in 20-foot minimum lengths. Otherwise, use 0.050-inch material.
      b. Color: As scheduled or otherwise approved by Architect. Custom color may be required if manufacturers standard colors do not match.
      c. Joints: Lap type.
   3. Accessories:
      a. Continuous cleat support.
      a. Continuous removable leaf screen with sheet metal frame and hardware cloth screen
      b. Wire ball downspout strainer

C. Heavy Duty downspout
   1. Fabricate rectangular downspouts complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors.
   2. Material: Roll-formed aluminum sections in 10-foot minimum lengths, same material and finish as metal roof panels.
      a. Size: 3”x4” inch rectangular section
      b. Color: As indicated, subject to Architect's approval.
      c. Thickness: 0.050 to 10 ft above ground; 0.032 above 10 ft.
      d. Joints: Lap type.
      e. Mounting: Wall brackets as required to fasten downspout into wall material and substrate. Locate brackets as indicated on Drawings.
      f. Design: Fabricate downspout sections as required to follow profile of wall surface.
   3. Fabricated Hanger Style: SMACNA figure designation 1-35C or 1-35H.
      a. Aluminum: 0.040 inch thick.

D. Downspout Adapter: Heavy-duty cast or fabricated rainwater leader boot, with cleanout for transition from downspout to underground pipe

2.13 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof and Roof to Wall Transition Expansion-Joint Cover: Fabricate from the following material: Zinc-Tin Alloy-Coated Stainless Steel: 0.0250 inch thick.

B. Base Flashing: Fabricate from the following material:
   1. For Areas in contact with aluminum gravel stops or coping: Aluminum: 0.040 inch thick.
   2. For Areas with no aluminum gravel stops or coping: Zinc-Tin Alloy-Coated Stainless Steel: 0.018 inch thick.

C. Counterflashing: Fabricate from the following material:
   1. For Areas with no aluminum coping: Zinc-Tin Alloy-Coated Stainless Steel: 0.018 inch thick.
   2. For areas in contact with aluminum coping: Aluminum: 0.0320 inch thick.
D. Flashing Receivers: Fabricate from: Zinc-Tin Alloy-Coated Stainless Steel: 0.015 inch thick.

E. Roof-Penetration Flashing: Fabricate from: Zinc-Tin Alloy-Coated Stainless Steel 0.018 inch thick.

F. Roof-Drain Flashing: Fabricate from: Zinc-Tin Alloy-Coated Stainless Steel: 0.015 inch thick.

2.14 AIR BARRIER MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F.
3. Products: Subject to compliance with requirements, provide one of the following:
   a. Carlisle Coatings & Waterproofing; CCW WIP 300HT.
   c. Henry Company; Blueskin PE200 HT.
   d. Metal-Fab Manufacturing, LLC; MetShield.
   e. Owens Corning; WeatherLock Metal High Temperature Underlayment.

4. Application: For use as part of overall air barrier system as necessary to maintain continuity of roof air barrier assembly with other parts of air barrier system.

END OF SECTION 07 7100
SECTION 07 7129 - MANUFACTURED ROOF EXPANSION JOINTS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Metal-flanged, bellows-type roof expansion assemblies.

B. Related Sections include the following:
   1. Division 06 Section "Miscellaneous Rough Carpentry" for wooden curbs for mounting roof expansion assemblies.
   2. Division 07 Sections for roofing assemblies for installations integral with roofing membrane
   3. Division 07 Section "Roof Accessories" for manufactured curbs for mounting roof expansion.

PART 2 - PRODUCTS

2.01 METALS

A. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness, minimum 0.015 inch thick.

2.02 MISCELLANEOUS MATERIALS

A. Roof Cement: ASTM D 4586, Type II.

B. Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and to remain watertight.


D. Flexible Cellular Sponge or Expanded Rubber: ASTM D 1056.

E. Silicone Extrusions: Classified according to ASTM D 2000, UV stabilized, and do not propagate flame.

F. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to withstand design loads.
   1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.

2.03 FIRE BARRIERS

A. Fire Barriers: Devices complying with requirements specified in Part 1 "Quality Assurance" Article for fire-test-response characteristics and designed for dynamic structural movement without material degradation or fatigue when tested according to ASTM E 1399. Provide roof expansion
assemblies with manufacturer's continuous, standard, flexible fire-barrier seals in back of joint system at locations indicated to provide fire-resistance rating not less than rating of adjacent construction.

2.04 BELLOWS-TYPE ROOF EXPANSION ASSEMBLIES

A. Metal-Flanged, Bellows-Type Roof Expansion Assemblies: Provide manufacturer's standard assemblies of sizes and types indicated, with prefabricated units for corner and joint intersections and horizontal and vertical transitions including those to other building expansion joints, splicing units, adhesives, coatings, and other components as recommended by roof expansion assembly manufacturer for complete installation. Fabricate assemblies specifically for roof-to-roof and roof-to-wall applications.

B. Provide assemblies consisting of exposed polymeric sheet over foam bellows, securely anchored at both edges to 3- to 4-inch-wide sheet metal nailing flanges, either flat or angle formed to fit cant or curbs as required. Insulate bellows with closed-cell, flexible rubber or plastic foam not less than 5/16 inch thick; adhere bellows to underside of polymeric sheet. Provide continuous moisture barrier across joint under assembly.

1. Available Products; Type and size as shown or as suitable and recommended by manufacturer, subject to requirements and compatible with roofing products:
   b. Balco Metalines; BRBG Series Roof Bellows.
   c. BMCA Insulation Products, Inc., GAF Materials Corporation; Metalastic.
   d. C/S Group; Model BRJ and BRJW.
   e. MM Systems Corporation; Series ERF and ERFL.
   f. Watson Bowman Acme Corp.; Model EEJ and EEJ/C.

2. Polymeric Sheet: Manufacturer's standard, black.

3. Metal Flanges: Stainless steel, minimum 0.015 inch thick.

4. Moisture Barrier: Manufacturer's standard, flexible, continuous, polymeric moisture barrier looped under roof expansion assemblies at locations indicated. Fill space with blanket-type, mineral-fiber insulation.

5. Fire Rating: To match fire rating requirements of adjacent construction.

END OF SECTION 07 7129
SECTION 07 8413 – PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:
   1. Floors.
   2. Walls and partitions.
   3. Smoke resistant partitions.
   4. Construction enclosing compartmentalized areas.

B. Related Sections include the following:
   1. Division 07 Section "Fire-Resistive Joint Systems."
   2. Divisions 20 through 23 Sections specifying additional requirements for duct and piping penetrations for HVAC, plumbing and fire-suppression systems.
   3. Division 26, 27, and 28 Sections specifying additional requirements for cable and conduit penetrations.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:
   3. Hilti, Inc.
   4. Isolatek International.
   6. Owens Corning
   7. Specified Technologies Inc.
   8. Tremco; Sealant/Weatherproofing Division.
   9. USG Corporation.
   10. 3M; Fire Protection Products Division.

2.02 FIRESTOPPING, GENERAL

A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
1. Permanent forming/damming/backing materials, including the following:
   a. Slag-/rock-wool-fiber insulation.
   b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
   c. Fire-rated form board.
   d. Fillers for sealants.
2. Temporary forming materials.
5. Steel sleeves.

2.03 FILL MATERIALS

A. General: Provide through-penetration firestop systems containing the types of fill materials needed to attain required fire protection rating of surface being penetrated. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.

B. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

C. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.

D. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

E. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

F. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

G. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.

H. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

I. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
   1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
   2. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
2.04 MIXING

A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

END OF SECTION 07 8413
SECTION 07 9200 - JOINT SEALANTS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:

1. Exterior joints in the following vertical surfaces and horizontal nontraffic surfaces:
   b. Control and expansion joints in unit masonry.
   c. Joints in exterior insulation and finish systems.
   d. Joints between different materials listed above.
   e. Perimeter joints between materials listed above and frames of doors, windows and louvers.
   f. Control and expansion joints in soffits and other overhead surfaces.
   g. Other joints as indicated.

2. Exterior joints in the following horizontal traffic surfaces:
   a. Isolation and contraction joints in cast-in-place concrete slabs.
   b. Other joints as indicated.

3. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
   a. Control and expansion joints on exposed interior surfaces of exterior walls.
   b. Perimeter joints of exterior openings where indicated.
   c. Tile control and expansion joints.
   d. Vertical joints on exposed surfaces of interior unit masonry walls and partitions.
   e. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
   f. Joints between plumbing fixtures and adjoining walls, floors, and counters.
   g. Other joints as indicated.

4. Interior joints in the following horizontal traffic surfaces:
   b. Control and expansion joints in tile flooring.
   c. Other joints as indicated.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.02 ELASTOMERIC JOINT SEALANTS
A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

C. Single-Component Medium Modulus Neutral-Curing Silicone Sealant:
   1. Joints:
      a. Exterior joints in exterior insulation and finish systems.
      b. Exterior butt and/or slip joints between metals.
   2. Products:
      a. Dow Corning Corporation; 795
      b. GE Silicones; SilPruf NB SCS9000.
      c. GE Silicones; UltraPruf II SCS2900.
      d. Pecora Corporation; 865.
   3. Type and Grade: S (single component) and NS (nonsag).
   5. Use Related to Exposure: NT (nontraffic).
   6. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

D. Single-Component Mildew-Resistant Acid-Curing Silicone Sealant:
   1. Joints:
      a. Interior ceramic tile expansion, control, contraction, and isolation joints in horizontal traffic surfaces.
      b. Interior joints between plumbing fixtures and adjoining walls, floors, and counters.
   2. Products:
      a. Dow Corning; 786 Mildew Resistant.
      b. GE Silicones; Sanitary SCS1700.
      c. Pecora Corporation; 898.
   3. Type and Grade: S (single component) and NS (nonsag).
   5. Use Related to Exposure: NT (nontraffic).
   6. Uses Related to Joint Substrates: M, G, A, and, as applicable to joint substrates indicated, O.

E. Multicomponent Pourable Urethane Sealant:
   1. Pavement Joints:
      a. Exterior horizontal nontraffic and traffic isolation and contraction joints in cast-in-place concrete slabs.
   2. Products:
      a. Pecora Corporation; Urexpans NR-200.
b. Pecora Corporation; Ureexpan NR 300, Type M.
c. Sonneborn, Division of ChemRex Inc.; SL 2.
d. Tremco; THC-900.

3. Type and Grade: M (multicomponent) and P (pourable).
5. Use Related to Exposure: T (traffic).
6. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrates indicated.

F. Single-Component Nonsag Polyurethane Sealant:
1. Joints:
   a. Exterior and interior vertical control and expansion joints in unit masonry and stone veneer.
   b. Exterior and interior perimeter joints between masonry and frames of doors, windows and louvers.
   c. Exterior and interior joints in vertical and horizontal nontraffic masonry surfaces and other materials.
   d. Vertical control and expansion joints on exposed interior surfaces of exterior masonry walls.
2. Products:
   a. Pecora Corporation; Dynatrol I.
   b. Tremco; DyMonic.
3. Type and Grade: S (single component) and NS (nonsag).
5. Use Related to Exposure: NT (nontraffic).
6. Uses Related to Joint Substrates: M, A, and as applicable to joint substrates indicated, O.

G. Multi-Component Nonsag Polyurethane Sealant: Where interior joints on concrete slabs-on-grade are indicated provide high-durometer urethane product complying with the following:
1. Products: Provide one of the following:
   a. Chemtron; Chemtron Polymers, Inc.
   b. HPL Sealant; Tremco.
2. Type and Grade: M (multi-component) and NS (nonsag).
3. Class: 12-1/2.
4. Use Related to Exposure: T (traffic).
5. Shore A Hardness: Per ASTM C 661 yields 44-55 after 14 days.

2.03 LATEX JOINT SEALANTS

A. Latex Sealant: Comply with ASTM C 834, Type P, Grade NF.

B. Joints:
   1. Interior perimeter joints of exterior openings.
2. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.

C. Products:
   1. Pecora Corporation; AC-20+.
   2. Sonneborn, Division of ChemRex Inc.; Sonolac.
   3. Tremco; Tremflex 834.

2.04 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type O (open-cell material) non-outgassing and as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.05 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

END OF SECTION 07 9200
SECTION 07 9513 – EXPANSION JOINT COVER ASSEMBLIES

PART 1 - GENERAL

1.01 SUMMARY

A. Types of joints for which architectural joint systems are specified include the following:
   1. Interior pedestrian traffic joints.
   2. Interior wall joints.
   3. Exterior wall joints

B. Related Sections include the following:
   1. Division 04 Section “Unit Masonry” for pre-molded masonry expansion joints.
   2. Division 07 Section "Roof Expansion Assemblies" for factory-fabricated roof joint systems.
   3. Division 07 Section "Joint Sealants" for elastomeric sealants and preformed compressed-foam sealants without metal frames.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis-of-Design Products: The design for each architectural joint system specified in Part 2 "Architectural Joint Systems" Article below is based on the products named. Subject to compliance with requirements, provide either the named products or comparable products by one of the other manufacturers listed.

2.02 MATERIALS

A. Aluminum: ASTM B 221, alloy 6063-T5 for extrusions; ASTM B 209, alloy 6061-T6 for sheet and plate.
   1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.

B. Isolation Gaskets Seals: Preformed, elastomeric extrusions having complying with ASTM E 1612 in sizes and profiles indicated or as recommended by manufacturer.

C. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint.

D. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, flexible moisture barrier and filler materials, drain tubes, lubricants, adhesives, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.03 ARCHITECTURAL JOINT SYSTEMS

A. General: Provide joint systems of design, basic profile, materials, and operation indicated. Provide units with the capability to accommodate joint widths indicated and variations in adjacent surfaces.
1. Furnish units in longest practicable lengths to minimize number of end joints. Provide hairline mitered corners where joint changes directions or abuts other materials.
2. Include closure materials and transition pieces, tee-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous joint systems.

B. Basis-of-Design Manufacturer: Balco Metalines
1. Subject to compliance with requirements, provide products by Basis of Design Manufacturer or one of the following:
   a. MM Systems Corp.
   b. Conspec Systems, Inc. Construction Specialties Group
   c. Watson Bowman Acme Corp.
   d. InPro JointMaster Engineered Metal Products
5. Movement Capability: 50 percent.
6. Type of Movement Capability: Expansion and contraction.
7. Cyclic-Movement-Test-Response Characteristics: No evidence of visual fatigue, inability to cycle between designated joint widths, or other types of failure as determined by testing products identical to those indicated per ASTM E 1399 including Appendix X3.
9. Exposed Frame Material: Same material and finish as exposed cover material.
10. Isolation Gasket: Provide manufacturer's standard unit.
11. Fire-Resistance Ratings: Provide manufacturer's standard fire barrier with a rating not less than that of adjacent construction.

C. Metal frames and covers for interior pedestrian traffic joints.
1. Balco Metalines Series 6000 6FTP Item No. 6FS-1-2

D. Metal frames and covers for interior joints on walls.
1. Balco Metalines Flexible Interior wall and ceiling system GCWW

E. Metal frames and covers for Exterior joints on walls.
1. Balco Metalines Exterior Flat Seal FCWWE

2.04 FINISHES, GENERAL
A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

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

B. One or both of the following, as scheduled or otherwise approved by Architect:
1. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 607.1.
2. Class II, Color Anodic Finish: AA-M12C22A32/A34 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, integrally colored or electrolytically deposited color coating 0.010 mm or thicker) complying with AAMA 611.

END OF SECTION 07 9513
SECTION 08 1113 – HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Hollow-metal steel doors and frames.
   2. Hollow-metal steel frames for mounting wood doors.
   3. Hollow-metal steel view windows.
   4. Hollow-metal fire-rated assemblies, positive-pressure.

B. Related Sections include the following:
   1. Division 04 Section "Unit Masonry Assemblies" for building anchors into and grouting standard steel frames in masonry construction.
   2. Division 07 Section "Joint Sealants" for caulking around door frames.
   3. Division 08 Sections “Door Hardware Schedule” and “Access Control Hardware” and “Door Hardware” for finish hardware in flush wood doors.
   4. Division 08 Section "Glazing" for glazed lites in standard steel doors and frames.
   5. Division 08 Section “Flush Wood Doors” for wood doors mounted in hollow metal frames.
   6. Division 09 Section “Painting” for field painting steel doors and frames.
   7. Division 26 and 28 Sections for electrical and access control requirements at doors.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Hollow Metal Doors and Frames: Subject to compliance with requirements, provide products by one of the following:
   1. Curries; an Assa Abloy Group company
   2. Ceco Door; Assa Abloy Group company
   3. Steelcraft; an Allegion Company.
   4. Republic Doors.

2.02 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653, Commercial Steel (CS), Type B; with minimum A40 zinc-iron-alloy (galvannealed) coating designation.

D. Electrolytic Zinc-Coated Steel Sheet: ASTM A 591, Commercial Steel (CS), Class B coating; mill phosphatized.
E. Supports and Frame Anchors: ASTM A 653, Commercial Steel (CS), Type B; with minimum G60 metallic coating.  
   1. After fabricating, galvanize units to be built into exterior walls according to ASTM A 153, Class B.

F. Inserts, Bolts, and Fasteners: Provide items to be built into exterior walls, hot-dip galvanized according to ASTM A 153.

G. Grout: Comply with Division 04 Section "Unit Masonry Assemblies."

H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-developed indexes of 25 and 50 respectively; passing ASTM E 136 for combustion characteristics.

I. Glazing: Comply with requirements in Division 08 Section "Glazing."

J. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.03 STANDARD STEEL DOORS

A. General: Provide 1-3/4 inch doors of design indicated, fabricated with smooth surface or wood grain-embossed surface as scheduled, without visible joints or seams on exposed faces, unless otherwise indicated. Comply with ANSI A250.8.  
   1. Basis of Design: Steel flush panel, standard by Curries/Assa Abloy  
      a. Factory Prime Finish: Curries Series 707N (polystyrene core) and Series 727N (mineral fire door core) with seamless welded edge.
   2. Thickness of Steel Panels: 0.053-inch (16 gage).
   3. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, mineral-board, or vertical steel-stiffener core that produces doors complying with ANSI A250.8.  
      a. Fire Door Core: As required to provide fire-protection ratings indicated.  
      b. Polystyrene and Polyurethane (Insulated) Doors: Where indicated, provide doors fabricated as thermal-rated assemblies with a minimum R-value 11 or better.
   6. Top and Bottom Edges: Closed with flush or inverted 0.042-inch-thick end closures or channels of same material as face sheets, extending the full width of the door and welded to the face sheet.

B. Interior Doors: Face sheets fabricated from cold-rolled steel sheet, unless otherwise indicated to comply with exterior door requirements. Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level:
1. Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch) steel, Model 2 (Seamless).
2. Finish: Shop primed.

C. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as door face sheets to comply with the following minimum sizes:
   1. Hinges: Minimum 7 gauge (3/16") plate 1-1/4" inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds, or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
   2. Lock Face, Flush Bolts, Closers, and Concealed Holders: Minimum 0.067 inch thick.
   3. All Other Surface-Mounted Hardware: Minimum 0.067 inch thick.

D. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.04 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI A250.8 and with details indicated for type and profile.

B. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008 (unless otherwise indicated to comply with exterior frame requirements.)
   1. Fabricate frames with mitered or coped and welded face corners and seamless face joints.
   2. Fabricate knocked-down frames with mitered or coped corners, for field assembly.
   3. Frames for Level 3 Steel Doors, and Stile and Rail Doors: 0.053-inch-thick steel sheet.
   4. Frames for Borrowed Lights: 0.053-inch-thick steel sheet.
   5. Frames for Wood Doors: 0.042-inch-thick (18 gage) steel sheet.
   6. Finish: Shop primed ready for field finish.

C. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames, to comply with the following minimum sizes:
   1. Hinges: Minimum 0.123 inch thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
   2. Lock Face, Flush Bolts, Closers, and Concealed Holders: Minimum 0.067 inch thick.
   3. All Other Surface-Mounted Hardware: Minimum 0.067 inch thick.

E. Supports and Anchors: Fabricated from electrolytic zinc-coated or metallic-coated steel sheet.

F. 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, welded to back of frames; not less than 0.042 inch thick.

3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

4. Compression Type for Drywall Slip-on (Knock-Down) Frames: Adjustable compression anchors.

G. Floor Anchors: Formed from same material as frames, formed from A60 metallic coated material not less than 0.042 inch thick, and as follows:
   1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
   2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch height adjustment. Terminate bottom of frames at finish floor surface.

H. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

I. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

J. Mortar/Plaster Guards: Formed from same material as frames, not less than 0.016-inch thick.

2.05 HOLLOW METAL PANELS

A. Provide hollow metal panels of same materials, construction, and finish as specified for adjoining hollow metal work.

2.06 STOPS AND MOLDINGS

A. 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 0.042 inch (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 high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.

D. Removable Stops for Glazed Lites in Frames: Minimum 0.042 inch thick, fabricated from same material as frames in which they are installed.

E. Glazing: Comply with requirements in Division 08 Section "Glazing" and with the hollow metal door manufacturer's written instructions.
   1. Factory Glazing: Factory install glazing in doors as indicated. Doors with factory installed glass to include all of the required glazing material.
2.07 MATERIALS - GLASS

A. Low-E Coated glass for use in insulated exterior units See Section 08 8000


C. Logo: Each piece of fire-rated glazing shall be labeled with a permanent logo including name of product, manufacture, testing laboratory (UL), fire rating period, safety glazing standards, and date of manufacture.

D. Glazing Accessories: Manufacturer’s standard compression gaskets, spacers, setting blocks and other accessories necessary for a complete installation.

2.08 FABRICATION

A. General: Fabricate standard steel doors and frames to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

1. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Standard Steel Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.

2. Glazed Lites: Factory cut openings in doors.

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".

5. Electrical Raceways: Provide hollow metal doors to receive electrified hardware with concealed wiring harness and standardized Molex plug connectors on both ends to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through-wire transfer hardware or wiring harness specified in hardware sets in Division 08 Section "Door Hardware". Wire nut connections are not acceptable.

D. Standard Steel Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Welded Frames: 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.
2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints; fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.

3. Equal Rabbet Frames: Provide frames with equal rabbet dimensions unless glazing and removable stops require wider dimensions on glass side of frame.

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.

7. Plaster Guards: Weld guards to frame at back of hardware mortises in frames installed in concrete or masonry.
   a. Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.

8. Where installed in masonry, leave vertical mullions in frames open at top for grouting.

9. Electrical Knock Out Boxes: Factory weld 18 gauge electrical knock out boxes to frame for electrical hardware preps; including but not limited to, electric through wire transfer hardware, electrical raceways and wiring harnesses, door position switches, electric strikes, magnetic locks, and jamb mounted card readers as specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware".
   a. Provide electrical knock out boxes with a dual 1/2-inch and 3/4-inch knockouts.
   b. Conduit to be coordinated and installed in the field (Division 26) from middle hinge box and strike box to door position box.
   c. Electrical knock out boxes to comply with NFPA requirements and fit electrical door hardware as specified in hardware sets in Division 08 Section "Door Hardware".
   d. Electrical knock out boxes for continuous hinges should be located in the center of the vertical dimension on the hinge jamb.

10. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.

11. Jamb Anchors: Provide number and spacing of anchors as follows:
   a. Masonry and 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 from 60 to 90 inches high.
      2) Four anchors per jamb from 90 to 120 inches in height.
   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) Four anchors per jamb from 60 to 90 inches in height.
      2) Five anchors per jamb from 90 to 96 inches in height.
      3) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof more than 96 inches in height.
      4) Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
c. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.

12. Door Silencers:
   a. Except on weather-stripped or gasketed doors, drill stops to receive door silencers as follows. Provide plastic plugs to keep holes clear during construction.
      1) Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
      2) Double-Door Frames: Drill stop in head jamb to receive two per door silencers.
   b. Silencers to be supplied by frame manufacturer whether or not specified in Division 08 Section "Door Hardware".

13. 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 standard steel doors and frames to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping, according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
   1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
   2. Reinforce doors and frames to receive nontemplated mortised and surface-mounted door hardware.
   3. Comply with applicable requirements in ANSI A250.6 and ANSI/DHI A115 Series specifications for door and frame preparation for hardware. Locate hardware as indicated on Shop Drawings or, if not indicated, according to ANSI A250.8.
   4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections, and prepare hollow metal work accordingly.

F. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
   1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of door or frame.
   2. Multiple Glazed Lites: Provide fixed and removable stops and moldings such that each glazed lite is capable of being removed independently.
   3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
   4. Provide removable stops and moldings on inside of doors and frames.

2.09 STEEL FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
   1. Finish standard steel door and frames after assembly.

B. Metallic-Coated Steel Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
C. Steel Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning"; remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel; comply with SSPC-SP 3, "Power Tool Cleaning," or SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

D. Factory Priming for Field-Painted Finish: Apply shop primer specified below immediately after surface preparation and pretreatment. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 0.7 mils.
1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied finish paint system indicated; and providing a sound foundation for field-applied topcoats despite prolonged exposure.

END OF SECTION 08 1113
SECTION 08 1416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Flush solid core low pressure clad or decorative laminate doors (WD).
   2. Factory fitting clad wood doors to frames and factory machining for hardware.

B. Related Sections include the following:
   1. Division 08 Section “Steel Doors and Frames” for steel frames.
   2. Division 08 Sections “Door Hardware” and "Access Control Hardware" for hardware in flush wood doors.
   3. Division 08 Section "Glazing" for glass view panels in flush wood doors.
   4. Division 27 Section "Electronic Access Control".

PART 2 - PRODUCTS

2.01 GENERAL

A. Locally Sourced Products and Materials: In compliance with approved Green Globes Action Plan, provide components and accessories manufactured within 250 miles of Project site, or from materials that have been extracted or recovered, as well as manufactured, within 250 miles of Project site. Identify such materials in Contractor’s Green Globes Progress Reports, to increase the likelihood of achieving target points for locally sourced products and materials.

2.02 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. The Maiman Company
   2. VT Industries Inc.
   4. Graham Wood Doors
   5. Eggers Industries; Architectural Door Division.

2.03 DOOR CONSTRUCTION

A. Doors for Laminated Finish:
   1. Grade: Premium
   2. Thermal-Fused-Laminate Faces: Low-pressure decorative laminates (LPDL) complying with NEMA LD 3-2005.
   3. Colors, Patterns, and Finishes: As scheduled.
   4. Exposed Vertical and Top Edges: 1mm polymer, as scheduled or otherwise approved.
      a. Polymer Edging Color: Coordinate with faces.
5. **WDMA I.S.1-A Performance Grade:** Extra Heavy Duty; Aesthetic Grade: Premium

B. **Interior Laminate-Faced Doors:**
   1. **Wood Stiles and Rails:** As required to meet Extra Heavy Duty Performance level.
   2. **Particleboard Core Doors:** ANSI A208.1, Grade M-2.
   3. **Mineral Core Doors:** Non-combustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire protection rating indicated.
   4. **Blocking:** As required to meet Extra Heavy Duty Performance level.
      a. **HB1:** 5 inch in doors indicated to have closers and overhead stops.
      b. **HB2:** 5 inch bottom rail blocking, in doors indicated to have kick plates.
      c. **HB3:** 5 inch top and bottom rail blocking, in doors indicated to have closers and kick plates.
      d. **HB4:** Two 5 inch x 14 inch lock blocking, in doors indicated to have exit devices.
      e. **HB5:** Two 5 inch x 14 inch corner blocking, in doors indicated to have flush bolts.
      f. **HB6:** 5 inch mid-rail blocking in doors indicated to have exit devices.
      g. **HB7:** 5 inch stile blocking.
      h. **HB8:** Two 5 inch x 14 inch corner blocking and two 5 inch x 14 inch lock blocking on doors to have vertical rod exit devices.
   5. **Edge Construction:** At hinge stiles, provide manufacturer's standard laminated-edge construction with improved screw-holding capability and split resistance and with outer stile matching polymer edging.

C. **Fire Rated Doors:** Provide blocking as indicated below:

D. **Labeled Fire-Rated Doors:**
   1. **Construction:** Construction and core specified above for type of face indicated and meeting minimum test ratings specified in Part 1 Article “Quality Assurance.”
   2. **Blocking:** For mineral-core doors, provide composite blocking with improved screw-holding capability approved for use in doors of fire ratings indicated as follows:
      a. **HB1:** 5 inch in doors indicated to have closers and overhead stops.
      b. **HB2:** 5 inch bottom rail blocking, in doors indicated to have kick plates.
      c. **HB3:** 5 inch top and bottom rail blocking, in doors indicated to have closers and kick plates.
      d. **HB4:** Two 5 inch x 14 inch lock blocking, in doors indicated to have exit devices.
      e. **HB5:** Two 5 inch x 14 inch corner blocking, in doors indicated to have flush bolts.
      f. **HB8:** Two 5 inch x 14 inch corner blocking and two 5 inch x 14 inch lock blocking on doors to have vertical rod exit devices.
   3. **Category A Edge Construction:** Provide fire rated door edge construction with intumescent seals concealed by outer stile (Category A) at 45, 60, and 90 minute rated doors. Comply with specified requirements for exposed edges.
   4. **Category B Edge Construction:** Provide 20 minute fire rated doors as Category B, with smoke and fire seals (supplied by seal manufacturer) applied to frame.
   5. **Pairs:** Provide fire retardant stiles that are listed and labeled for applications indicated without formed steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
      a. Where required or specified, provide formed steel edges and astragals with intumescent seals. Finish steel edges and astragals with baked enamel.
2.04  LOW PRESSURE DECORATIVE LAMINATE (LPDL) FACED DOORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Eggers Industries – eiDoor.
   2. The Maiman Company – Thermal Fused.

B. Low Pressure Decorative Laminate (LPDL) Thermal Fused Faces:
   2. Color or Wood Grain Pattern: To be selected by Architect from manufacturer’s standard faces.

C. Exposed Edges: Impact resistant polymer edging, minimum .040” thick, applied to all four edges after faces.

D. Polymer Edging Color or Wood Grain Pattern: Manufacturer's standard color that most closely matches faces.

E. Provide doors with pilot holes factory drilled for vertical edge hinges and lock sets.

F. Where continuous hinges are specified, provide coarse thread particle board screws designed for use in dense wood.

2.05  PLASTIC LAMINATE FACED WOOD DOORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Eggers Industries: Premium
   2. Graham: GPD
   3. Marshfield: Signature
   5. Lambton:

B. Interior Solid Core Doors:
   1. Faces: Plastic laminate to be selected by Architect from manufacturer’s standard faces.
   2. Vertical Edges: Matching laminate as faces.
   3. Horizontal Edges: Solid wood or structural composite material meeting the minimum requirements per WDMA section P-1, Performance Standards for Architectural Wood Flush Doors.

2.06  LIGHT FRAMES AND GLAZING

A. Wood Beads for Light Openings in Wood Doors up to and including 20-minute rating:
   1. Wood Species: Any compatible closed-grain hardwood acceptable to Architect.
   2. Profile:
      a. M1 Flush Bead.
      b. M2 Beveled Flush Bead.
      c. M3 Lipped.
      d. M5 Beveled Lip Bead.
      e. At wood core doors with 20-minute fire protection ratings, provide wood beads and metal glazing clips approved for such use.
B. Metal Frames for Light Openings in Fire Rated Doors over 20-minute Rating: 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.
   1. Air Louver.
   2. All Metal Stamping.
   3. Anemostat.
   4. Pemko.

C. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with the flush wood door manufacturer's written instructions.
   1. Pre-Installed Glazing: Install glazing in doors as indicated. Pre-installed glass to include all of the required glazing material.

2.07 FABRICATION

A. Fabricate doors in sizes indicated for Project-site fitting.

B. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:
   1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements in NFPA 80 for fire-rated doors.
   2. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
   3. Bevel fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) on lock edge; trim stiles and rails only to extent permitted by labeling agency.

C. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
   1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
   2. Metal Astragals: Factory machine astragals and formed steel edges for hardware for pairs of fire rated doors.

D. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind of door required.
   1. Light Openings: Trim openings with moldings of material and profile indicated.
   2. Undercut: Factory trim as scheduled

E. Glazed Openings: Factory install glazing in doors, complying with Section 08 8000 "Glazing." Install glass using manufacturer's standard elastomeric glazing sealant complying with ASTM C 920. Secure glass in place with wood moldings fixed on public side, removable on secured side. Miter wood moldings at corner joints.
   1. Contractor’s option: Subject to compliance with requirements and approval by Architect, install glazing in the field.

F. Provide Factory-Undercut doors where scheduled.

G. Transom and Side Panels: Fabricate panels to match adjoining doors in materials, finish, and quality of construction.

H. Wainscot Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors.
1. **Square End.**

I. **Electrical Raceways:** Provide flush wood doors receiving electrified hardware with concealed wiring harness and standardized Molex plug connectors on both ends to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through wire transfer hardware or wiring harness specified in hardware sets in Division 08 "Door Hardware". Wire nut connections are not acceptable.

END OF SECTION 08 1416
SECTION 08 3113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following: Access doors and frames.
1. Access doors and frames for walls and ceilings.

B. Except as otherwise indicated, access doors and frames shall be sized and located as indicated on Coordination Drawings prepared under Section 01 3100, and shall be furnished and installed under the General Contract.
1. Provide access doors and frames as indicated in Contract Drawings, or otherwise required by authorities having jurisdiction, whether or not indicated on Contract Documents.

C. Related Sections include the following:
1. Division 03 Section "Cast-in-Place Concrete" for blocking out openings for access doors and frames in concrete where applicable.
2. Division 04 Section "Unit Masonry" for anchoring and grouting access door frames set in masonry construction where applicable.
3. Division 08 Section "Door Hardware" for cylinder locks and master keying.
4. Division 09 Section "Acoustical Ceilings" for suspended acoustical tile ceilings.
5. Division 23 Sections for requirements for duct access doors.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36.
1. Hot-Dip Galvanized Steel: Coat to comply with ASTM A 123 for steel and iron products and ASTM A 153 for steel and iron hardware.

B. Steel Sheet:
1. Hot-Rolled: ASTM A 569, Commercial Steel (CS), Type B; free of scale, pitting, and surface defects; pickled and oiled.
2. Cold-Rolled: ASTM A 366, Commercial Steel (CS), or ASTM A 620, Drawing Steel (DS), Type B; stretcher-leveled standard of flatness.
   a. Electrolytic zinc-coated steel sheet, complying with ASTM A 591/A 591M, Class C coating, may be substituted at fabricator's option.

C. Steel Finishes: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
1. Surface Preparation for Steel Sheet: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
2. Surface Preparation for Metallic-Coated Steel Sheet: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion
coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.


3. **Factory-Primed Finish**: Apply shop primer immediately after cleaning and pretreating.

4. **Baked-Enamel Finish**: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

5. **Shop Primer for Metallic-Coated Steel**: Organic zinc-rich primer complying with SSPC-Paint 20 and compatible with topcoat.

D. **Drywall Beads**: Edge trim formed from 0.0299-inch zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

E. **Plaster Beads**: Casing bead formed from 0.0299-inch zinc-coated steel sheet with flange formed out of expanded metal lath and in size to suit thickness of plaster.

2.02 **STAINLESS-STEEL MATERIALS**

A. **Rolled-Stainless-Steel Floor Plate**: ASTM A 793, manufacturer's standard finish.

B. **Stainless-Steel Sheet, Strip, Plate, and Flat Bars**: ASTM A 666, Type 304. Remove tool and die marks and stretch lines or blend into finish.

1. **Finish**: Directional Satin Finish, No. 4.

2.03 **ALUMINUM MATERIALS**

A. **Aluminum Extrusions**: ASTM B 221, Alloy 6063-T6.

1. **Mill finish**, AA-M10 (Mechanical Finish: as fabricated, unspecified).

B. **Aluminum-Alloy Rolled Tread Plate**: ASTM B 632, Alloy 6061-T6.

1. **Mill finish**, AA-M10 (Mechanical Finish: as fabricated, unspecified).

C. **Aluminum Sheet**: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of Alloy 5005-H15; with minimum sheet thickness indicated representing specified thickness according to ANSI H35.2.

1. **Class II, Clear Anodic Finish**: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.

2.04 **ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS**

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

1. **Acudor Products, Inc.**
2. Babcock-Davis; A Cierra Products Co.
4. Elmdor/Stoneman; Div. of Acorn Engineering Co.
5. Jensen Industries.
9. MIFAB, Inc.
10. Milcor Inc.

   1. Locations: wall and ceiling surfaces.
   2. Door: Minimum 0.060-inch thick sheet metal, set flush with exposed face flange of frame.
   3. Frame: Minimum 0.060-inch thick sheet metal with 1-1/4-inch wide, surface-mounted trim.
   4. Hinges: Continuous piano.
   5. Latch: Cam latch operated by screwdriver with interior release.

   1. Locations: Wall and ceiling surfaces.
   2. Door: Minimum 0.060-inch thick sheet metal, set flush with surrounding finish surfaces.
   3. Frame: Minimum 0.060-inch thick sheet metal with drywall bead flange.
   4. Hinges: Continuous piano.
   5. Latch: Cam latch operated by screwdriver with interior release.

   1. Locations: Wall and ceiling surfaces.
   2. Door: Minimum 0.060-inch thick sheet metal in the form of a pan recessed 5/8 inch for gypsum board infill.
   3. Frame: Minimum 0.060-inch thick sheet metal with drywall bead flange for gypsum board surfaces.
   5. Latch: Cam latch operated by screwdriver with interior release.

   1. Locations: Wall and ceiling surfaces. Provide this type of access door in restroom locations.
   2. Door: Minimum 0.080-inch thick aluminum sheet.
   3. Frame: Minimum 0.060-inch thick extruded aluminum with 1-1/4-inch wide flange.
   5. Latch: Screwdriver-operated cam latch.
   6. Latch: Restroom locations – provide key locks. Provide two sets of keys to owner for each access door.

   1. Locations: Wall and ceiling surfaces.
   2. Door: Minimum 0.040-inch thick, metallic-coated steel sheet; flush panel construction with manufacturer's standard 2-inch thick fiberglass insulation.
   3. Frame: Minimum 0.060-inch thick extruded aluminum.
   5. Lock: Dual-action handles with key lock.
   1. Locations: Wall and ceiling surfaces.
   2. Fire-Resistance Rating: Not less than that of adjacent construction.
   3. Temperature Rise Rating: 250 deg F at the end of 30 minutes.
   4. Door: Flush panel with a core of mineral-fiber insulation enclosed in sheet metal with a minimum thickness of 0.036 inch.
   5. Frame: Minimum 0.060-inch thick sheet metal with 1-1/4 inch wide, surface-mounted trim.
   6. Hinges: Continuous piano.
   8. Latch: Self-latching device operated by ring turn with interior release.

   1. Locations: Wall and ceiling surfaces.
   2. Fire-Resistance Rating: Not less than that of adjacent construction.
   3. Temperature Rise Rating: 250 deg F at the end of 30 minutes.
   4. Door: Flush panel with a core of mineral-fiber insulation enclosed in sheet metal with a minimum thickness of 0.036 inch.
   5. Frame: Minimum 0.060-inch thick sheet metal with drywall bead.
   6. Hinges: Continuous piano.
   8. Latch: Self-latching device operated by ring turn with interior release.

I. Hardware: Provide the following:
   2. Latch: Stainless-steel slam latch.
   3. Hardware Material: Manufacturer's standard.

2.05 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
   1. Exposed Flanges: Nominal 1 to 1-1/2 inches wide around perimeter of frame.
   2. For trimless frames with drywall bead, provide edge trim for gypsum board and gypsum base securely attached to perimeter of frames.
   3. For trimless frames with plaster bead for full-bed plaster applications, provide zinc-coated expanded metal lath and exposed casing bead welded to perimeter of frames.
   4. Provide mounting holes in frames for attachment of units to metal or wood framing.
D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling.
   1. For recessed doors with plaster infill, provide self-furring expanded metal lath attached to door panel.

E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
   1. For cylinder lock, furnish two keys per lock and key all locks alike.
   2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

F. Extruded Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

END OF SECTION 08 3113
SECTION 08 3323 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes manually and electric-motor-operated overhead coiling doors:
   1. Interior counter doors, manual operation

B. Related Sections include the following:
   1. Division 05 Section "Metal Fabrications" for miscellaneous steel supports.
   2. Division 08 Section "Door Hardware" for lock cylinders and keying.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Cornell Iron Works Inc. 800 233-8366
   1. Local distributor: Specified Supply, Inc. 412.304.3841

B. Subject to compliance with requirements, provide products by one of the following:
   1. Clopay Building Products Company, Inc.
   2. Cookson Company.
   3. Overhead Door Corp.
   4. Raynor.
   5. Wayne-Dalton Corp.
   6. McKeon Door Company

2.02 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling door curtain of interlocking slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
   1. Stainless Steel Kitchen Counter Door Slats No. 1F, interlocked flat-faced slats, 1 1/2-inch high by 1/2-inch deep, 22 gauge AISI Type 304 ASTM A 666 Stainless Steel.
      a. Flat profile slats.
      b. Sheet thickness of 0.025 inch and as required to meet requirements.
   2. Aluminum Counter Door Curtain Slats: ASTM B 209 or ASTM B 221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated
      a. Aluminum Extrusion Thickness: Not less than 0.040 inch and as required to meet performance requirements.
      b. Flat profile slats, nom. 1 1/2-inch high by 1/2-inch deep, or as otherwise approved

B. Endlocks for Counter Doors: Manufacturer's standard locks on not less than alternate curtain slats for curtain alignment and resistance against lateral movement.
C. Bottom Bar for Counter Doors: Manufacturer's standard continuous channel or tubular shape, metal to suit type of curtain slats.

D. Astragal: Provide a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene; for placement between angles or fitted to shape, as a cushion bumper for door.

E. Curtain Jamb Guides: Fabricate curtain jamb guides angles or channels and angles, of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide continuous integral wear strips/ pile runners on both sides of curtain, to prevent metal-to-metal contact and to minimize operational noise. Provide removable stops on guides to prevent overtravel of curtain, and a continuous bar for holding windlocks.

2.03 HOODS AND ACCESSORIES

A. Hood: Provide where indicated. Form to act as weatherseal and entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Provide closed ends for surface-mounted hoods and provide fascia for any portion of between-jamb mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sagging.
   1. Stainless Steel: 0.025-inch-thick stainless-steel sheet, Type 304, complying with ASTM A 666.
   2. Aluminum: 0.040-inch-thick aluminum sheet complying with ASTM B 209, of alloy and temper recommended by manufacturer and finisher for type of use and finish indicated.
   3. Shape: Round, unless otherwise indicated.
   4. Hood and fascia finish: exposed surfaces to match door assembly.

B. Locking Device Assemblies:
   1. Crank Hoist: Padlockable slide bolt on coil side of bottom bar at each jamb extending into slots in guides.
   3. Manufacturer's standard locking assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
      a. Lock Cylinders: Manufacturer's standard, coordinated as specified in Division 08 Section "Door Hardware," and keyed to building keying system.
      b. Locking Bars: Full-disc cremone type, both jamb sides operable from inside and outside.

C. Interior Counter Door, between-jamb mounting: Provide integral frame, hood, and fascia of welded sheet metal assembly.

D. Equip door with manufacturer's recommended manual door operator unless another type of door operator is indicated.
   1. Push-up Operation: Design counterbalance mechanism so required lift or pull for door operation does not exceed 25 lbf.
2.04 COUNTERBALANCING MECHANISM

A. General: Counterbalance doors by means of adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to door curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of hot-formed, structural-quality, welded or seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.

C. Provide spring balance of one or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Provide cast-steel barrel plugs to secure ends of springs to barrel and shaft.

D. Fabricate torsion rod for counterbalance shaft of cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Provide mounting brackets of manufacturer's standard design, either cast iron or cold-rolled steel plate.

2.05 FINISHES, GENERAL

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

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.06 STAINLESS-STEEL FINISHES

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

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
   1. Run grain of directional finishes with long dimension of each piece.
   2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
   3. Directional Satin Finish: No. 4.

2.07 ALUMINUM FINISHES

A. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat, according to coating manufacturer's written instructions for cleaning, pretreatment, application, thermosetting, and minimum dry film thickness.

   1. Color and Gloss: As scheduled.

END OF SECTION 08 3323
SECTION 08 4113 - ALUMINUM-FRAMED ENTRANCES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Exterior and interior aluminum-framed glazed entrances, doors, storefronts. Glazing is retained mechanically with gaskets on four sides.
   2. Exterior manual-swing FRP (Fiberglass Reinforced Polyester) flush doors.

B. Related Sections include the following:
   1. Division 07 Section "Joint Sealants" for installation of joint sealants installed with aluminum-framed systems and for sealants to the extent not specified in this Section.
   2. Division 08 Section "Aluminum Windows" for fixed and operating window assemblies.
   3. Division 08 Section "Glazing" for glazing requirements to the extent not specified in this Section.
   4. Division 08 Section "Glazed Aluminum Curtain Wall" for coordinating finish among aluminum fenestration units.
   5. Division 08 Section "Door Hardware" for hardware to the extent not specified in this Section.
   6. Division 26 and 28 Sections for electrical and access control requirements at entrances

PART 2 - PRODUCTS

2.01 ALUMINUM ENTRANCES

A. Provide glazed building entrance systems and products, satisfying the specified requirements, by approved manufacturer.
   1. 5-in wide stile non-thermal break door with glazing per schedule.
      a. Basis of Design: Series D500 Wide Stile swing door by EFCO
      b. Model 50D Wide Stile by YKK AP.
      c. 500 Standard by Kawneer
   2. 2” x 4-1/2” tubular frame with glazing per schedule.
      a. Basis of Design: Series 403 (exterior) and Series 401 (interior) by EFCO
      b. YES 45 FI by YKK AP.
      c. 451T by Kawneer
   3. Accessories: Provide additional manufacturer’s standard or custom features, as shown or specified, as recommended by Manufacturer and approved by Architect, or as needed for a complete and properly performing installation.

B. Subject to compliance with requirements, acceptable manufacturers of systems similar to those specified, as approved by Architect, are as follows:
   1. Oldcastle Building Envelope
   2. Wausau Window and Wall Systems
C. FRP Doors and Frames:
   1. Special-Lite, Inc.
   2. Commercial Door Systems
   3. Corrim Company
   4. CECO Door Products.
   5. Curries Company.
   6. Fleming Door Products.
   7. Vale Doors
   8. Aluminum Door manufacturer

D. Insulating Metal Glazing Panels
   1. Basis of Design: Corelite Moisture-Resistant Insulating Composite Panel by Mapes Panels LLC
   2. Alclad Insulated Glazing Panel by Columbia Architectural Products, Inc
   3. Architectural Insulated Infill Panel by High Standard, Inc.
   4. Thermolite Architectural Panel by Laminators Inc
   5. Endurex 500 Series exterior architectural panel by Nudo Products Inc

2.02 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
   2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
   5. Welding Rods and Bare Electrodes: AWS A5.10.

B. Steel Reinforcement: With manufacturer's standard corrosion-resistant primer complying with
   SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select
   surface preparation methods according to recommendations in SSPC-SP COM and prepare
   surfaces according to applicable SSPC standard.
   1. Structural Shapes, Plates, and Bars: ASTM A 36.
   2. Cold-Rolled Sheet and Strip: ASTM A 1008.

C. Fiberglass Reinforced Plastic Sheet: Thickness of .120” with the finish color for the full thickness
   of the sheet.

2.03 FRAMING SYSTEMS

A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness
   required and reinforced as required to support imposed loads.
   1. Construction: Framing members are composite assemblies of two separate extruded-
      aluminum components permanently bonded by an elastomeric material of low thermal
      conductance.

B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining,
   nonferrous shims for aligning system components.
C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
   1. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
   2. Reinforce members as required to receive fastener threads.

D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.

E. Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials. Form exposed flashing from sheet aluminum finished to match framing and of sufficient thickness to maintain a flat appearance without visible deflection.

F. Framing System Gaskets and Sealants: Manufacturer's standard recommended by manufacturer for joint type.

2.04 GLAZING SYSTEMS

A. Glazing: As scheduled and as specified in Division 08 Section "Glazing."
   1. Glazing Gaskets: Manufacturer's standard compression types, replaceable, molded or extruded, that maintain uniform pressure and watertight seal.
   2. Spacers and Setting Blocks: Manufacturer's standard elastomeric types.

2.05 DOORS

A. Glazed Alum. Storefront Doors: As specified under “Manufacturers” Article above.
   1. Finish: As scheduled.
   2. Door Bottom Rails: Bottom rails must be a minimum of 10 inches high.

B. FRP Door Construction: 1-3/4-inch overall thickness with 1/4-inch SL-20 FRP face sheets with minimum 0.125-inch-extruded-aluminum edging/framing members with poured-in-place urethane cores. Mechanically fasten corners with reinforcing brackets that are deep penetration and fillet welded or that incorporate concealed tie rods.
   1. Colors, as indicated on drawings and as verified with Architect.
   2. Door Design: As indicated on Drawings, with rectangular vision lites where indicated.
      b. Stiles and Rails: Extruded aluminum with mitered corners. Provide 3/8” diameter tie rods top and bottom.
      c. Faces: Fiberglass reinforced plastic sheets of .120” thickness with a pebble texture.
      d. Panel Pattern: Pebbled
   3. Locations: Exterior Doors as scheduled.
      a. Provide nonremovable glazing stops on outside of door.
      b. Finish: Thermafused organic paint glazing stops to match door finish color.
   5. Surface Applied Hardware Reinforcements: Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of work for hardware.
a. Factory prepare 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."

b. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.

c. Reinforce doors to receive non-template, mortised and surface-mounted door hardware.

2.06 DOOR HARDWARE

A. Door Hardware: As scheduled and specified in Division 08 Section "Door Hardware," and as follows

B. Exit devices specified in Division 08.

C. Silencers: BHMA A156.16, Grade 1.

D. Manual Flush Bolts: BHMA A156.16, Grade 1.

E. Operating Trim: BHMA A156.6.

F. Thresholds: Raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch.

G. Finger Guards: Manufacturer's standard collapsible neoprene or PVC gasket anchored to frame hinge-jamb at center-pivoted doors.

H. FRP Doors:
   1. Door Pulls – SL-82 Recessed Pull for flush doors by Special-Lite, or CDS-P2 by Commercial Door Systems, or similar component by approved door manufacturer. Anodized aluminum finish.
   2. Weather Stripping at Jamb, Head, Threshold, and Meeting Stiles by door manufacturer. Manufacturer's standard replaceable components.

I. Glazed Aluminum Doors:
   1. Weather Stripping: Manufacturer's standard replaceable components.
      a. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
      b. Sliding Type: AAMA 701, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.

2.07 ACCESSORY MATERIALS

A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants."

B. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.
2.08 FABRICATION

A. Form aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
   1. Profiles that are sharp, straight, and free of defects or deformations.
   2. Accurately fitted joints with ends coped or mitered.
   3. Means to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
   4. Physical and thermal isolation of glazing from framing members.
   5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing (without projecting stops).

E. Door Frames: Reinforce as required to support loads imposed by door operation and for installing hardware.
   1. At exterior doors, provide compression weather stripping at fixed stops.
   2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

F. Doors: Reinforce doors as required for installing hardware.
   1. At pairs of exterior doors, provide sliding weather stripping retained in adjustable strip mortised into door edge.
   2. At exterior doors, provide weather sweeps applied to door bottoms.

G. Hardware Installation: Factory install hardware to the greatest extent possible. Cut, drill, and tap for factory-installed hardware before applying finishes.

H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.09 ALUMINUM FINISHES

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

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

C. Organic Finish: AA-C12C42R1x High-Performance finish on interior and exterior surfaces.
   1. Chemical Finish: cleaned with inhibited chemicals; acid-chromate-fluoride-phosphate conversion coating
2. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.

   a. Color on the exterior shall be the same as on the interior.
   b. Provide custom yellow color to match Basis of Design if necessary.

END OF SECTION 08 4113
SECTION 08 4413 – GLAZED ALUMINUM CURTAIN WALL

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes:
   1. Conventionally glazed aluminum curtain wall system

B. Related Sections include the following:
   1. Division 07 Section "Joint Sealants" for installation of joint sealants installed with aluminum
curtain wall systems and for sealants to the extent not specified in this Section.
   2. Division 08 Sections "Aluminum-Framed Entrances" and "Aluminum Windows" for
   coordinating finish among aluminum fenestration units.
   3. Division 08 Sections "Aluminum-Framed Entrances" for wide-stile glazed aluminum door
   requirements.
   4. Division 08 Section "Glazing" for glazing requirements to the extent not specified in this
   Section.

PART 2 - PRODUCTS

2.01 CURTAINWALL SYSTEMS

A. Subject to compliance with requirements, provide Basis of Design curtain wall or products by
another approved manufacturer.
   1. Basis of Design: EFCO 2 1/2 by 7 1/2 Series 5600 curtainwall system with Duracast
   pressure plates as detailed.
      a. YCW 750 OGP by YKK AP.
      b. 1600 Series System by Kawneer

   2. Provide additional manufacturer’s standard or custom features, as shown or specified, as
   recommended by Manufacturer and approved by Architect, or as needed for a complete and
   properly performing installation. Include the following:
      a. Special formed or extruded aluminum covers, closures, 10” bottom rails in profiles as
         required.
      b. Miscellaneous clips, trim and installation accessories.

B. Subject to compliance with requirements, acceptable manufacturers of systems similar to those
specified, as approved by Architect, are as follows:
   1. Oldcastle Building Envelope
   2. Wausau Window and Wall Systems

2.02 FRAMING SYSTEMS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
   2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221.
   4. Welding Rods and Bare Electrodes: AWS A5.10.
B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
   1. Provide steel reinforcing in vertical mullions where necessary to comply with performance requirements.

C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
   1. Where fasteners are subject to loosening or turn out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
   2. Reinforce members as required to receive fastener threads.
   3. Use exposed fasteners with countersunk Phillips screw heads.
   4. Finish exposed portions to match framing system.
   5. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended by manufacturer.

D. Anchors: Three-way adjustable anchors that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
   1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.

E. Duracast Pressure Plate: Material shall be a fiberglass composite with a flexural strength of no less than 82 ksi along the lineal’s major axis.
   1. Material thermal conductivity shall be no more than 2 BTU∙in/hr∙ft²·°F.
   2. Alternative pressure plate material is acceptable as long as thermal performance is equivalent.

F. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

G. Framing Gaskets: As recommended by manufacturer for joint type.

H. Framing Sealants: As recommended by manufacturer for joint type.

2.03 ACCESSORY MATERIALS

A. Insulating Materials: Specified in Division 07 Section "Thermal Insulation."

B. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.04 FABRICATION

A. Form aluminum shapes before finishing.

B. Fabricate components that, when assembled, have the following characteristics:
   1. Sharp profiles, straight and free of defects or deformations.
   2. Accurately fitted joints with ends cope or mitered.
   3. Internal guttering systems or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
   4. Physical and thermal isolation of glazing from framing members.
5. Accommodations for thermal and mechanical movements of glazing and framing to prevent glazing-to-glazing contact and to maintain required glazing edge clearances.
6. Provisions for reglazing from exterior only.

C. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.05 ALUMINUM FINISHES

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

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

C. Organic Finish: AA-C12C42R1x High-Performance finish on interior and exterior surfaces.
   1. Chemical Finish: cleaned with inhibited chemicals; acid-chromate-fluoride-phosphate conversion coating
   2. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.
   3. Colors: Custom color yellow. Basis of Design - EFCO Golden Rod. Color on the exterior shall be the same as on the interior.

END OF SECTION 08 4413
SECTION 08 5113 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes aluminum windows of the performance class indicated. Window types required include the following:
   1. Project-out awning vent windows.
   2. Fixed windows.

B. Work Included: Provide materials necessary to complete the Work specified. Include:
   1. Provide new factory glazed aluminum windows units, together with necessary mullions, subframe, trim, muntins, operating hardware, installation hardware, and all other accessories necessary for a complete and finished installation.
   2. Remove from site and legally dispose of all debris, packaging, banding, and all other surplus materials and equipment.
   3. Seal all joints within each window assembly.
   4. Seal entire perimeter of window units after installation.
   5. Observe field conditions and field-verify measurements of existing openings and conditions.
   6. Furnish extra materials as specified.
   7. Installation instructions.
   8. Field visitations by window manufacturer as required to assure proper installation procedures.

C. Related Sections include the following:
   1. Division 07 Section "Joint Sealants" for installation of joint sealants installed with aluminum-framed systems and for sealants to the extent not specified in this Section.
   2. Division 08 Section "Aluminum Framed Entrances" for coordinating finish among aluminum fenestration units.
   3. Division 08 Section "Glazed Aluminum Curtain Wall" for coordinating finish among aluminum fenestration units.
   4. Division 08 Section "Glazing" for additional glazing requirements for aluminum windows, including those specified to be factory glazed.

PART 2 - PRODUCTS

2.01 WINDOW SYSTEMS

A. Operable and Fixed Windows: Subject to compliance with requirements, provide the Basis for Design window systems, or products by another approved manufacturer satisfying the specified requirements.
   1. Basis for Design: EFCO Series 325 Thermal, Architectural Grade Project-out and fixed Windows
a. Include special formed or extruded aluminum covers, closures, clips, subframes, shapes, and trim as shown.

2. Kawneer, an Alcoa Company
3. YKK AP America Inc.
4. Oldcastle Building Envelope
5. Wausau Window and Wall Systems

2.02 MATERIALS, GENERAL

A. Aluminum Extrusions: Alloy 6063-T5 and temper recommended by aluminum window manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000-psi ultimate tensile strength, not less than 16,000-psi minimum yield strength.
   1. Mechanical fasteners, welded components, and hardware items shall not bridge thermal barriers.
   2. Depth of frame and vent, nom. 3-1/4 to 4 inches as detailed on the Drawings.

B. Fasteners: Aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum window members, trim, hardware, anchors, and other components. Cadmium-plated steel fasteners are not permitted.
   1. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125 inch thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard, noncorrosive, pressed-in, splined grommet nuts.
   2. Exposed Fasteners: Unless unavoidable for applying hardware, do not use exposed fasteners. For application of hardware, use fasteners that match finish of member or hardware being fastened, as appropriate.

C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated. Cadmium-plated steel anchors, clips, and accessories are not permitted.

D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated. Cadmium-plated steel reinforcing members are not permitted.

E. Weather-Stripping Material: Manufacturer's standard system complying with NAFS.
   1. Compression-Type Weather Stripping: Provide compressible weather stripping designed for permanently resilient sealing under bumper or wiper action and for complete concealment when aluminum window is closed.

F. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, nonshrinking, and nonmigrating type recommended by sealant manufacturer for joint size and movement.

2.03 GLAZING

A. Glass and Glazing Materials: Refer to Division 08 Section "Glazing" for insulating-glass units and glazing requirements applicable to glazed aluminum window units.
B. Provide factory glazed windows as scheduled on Drawings.
   1. Type G1: 1-inch IG, low-E. Provide patterned interior lite where indicated.
   2. Type G3: 1-inch Insulating Metal Glazing Panels, outside glazed in same plane as G1vision glazing.

C. Solar Heat-Gain Coefficient (SHGC): Provide aluminum windows with a whole-window SHGC maximum of 0.40, determined according to NFRC 200 procedures.

2.04 INSULATING METAL GLAZING PANELS

A. Provide systems and products, satisfying the specified requirements, by approved manufacturer.
   1. Basis of Design: SPS or Corelite Moisture-Resistant Insulating Composite Panel by Mapes Panels LLC
   2. Columbia Architectural Products, Inc
   3. High Standard, Inc
   4. Laminators Inc
   5. Nudo Products
   6. Citadel Architectural Products

B. Metal Fabricated Panels: Laminated, metal-faced flat panels with no deviations in plane exceeding 0.8 percent of panel dimension in width or length.
   1. Overall Panel Thickness: 1-inch for glazing into system.
   2. Exterior Skin: Aluminum.
      a. Thickness: Manufacturer's standard for finish and texture indicated.
      b. Finish: 0.032 Kynar.
      c. Texture: Smooth.
      d. Backing Sheet: Corrugated HDPE or solid thermoplastic substrate.
      e. Color: As scheduled on Drawing. Use approved custom color if necessary.
   3. Thermal Insulation Core: Manufacturer's standard rigid, closed-cell, polyisocyanurate board, extruded-polystyrene board, or expanded-perlite, mineral-insulation board, as acceptable to fire-test response requirements of authorities having jurisdiction.
   4. Interior Skin: Aluminum.
      a. Thickness: Manufacturer's standard for finish and texture indicated.
      b. Finish: 0.032 Kynar.
      c. Texture: Smooth.
      d. Backing Sheet: Corrugated HDPE or solid thermoplastic substrate.
      e. Color: Manufacturer’s standard white.
   5. Surface-Burning Characteristics: For exposed interior surfaces of panels, when tested according to ASTM E 84 as follows:
      a. Flame-Spread Index: 25 or less.
      b. Smoke-Developed Index: 450 or less.
2.05 HARDWARE

A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, carbon steel complying with AAMA 907, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely lock aluminum windows and sized to accommodate sash or ventilator weight and dimensions. Cadmium-plated hardware is not permitted. Do not use aluminum in frictional contact with other metals. Where exposed, provide extruded, cast, or wrought aluminum, solid white bronze, die-cast zinc with special coating finish or nonmagnetic stainless steel.

B. Hardware: Comply with AAMA 904 (PROJECTING)
   1. Cam type locking handles; white bronze alloy with a US25D brushed finish.
   2. Operating hardware shall be four-bar stainless steel arms.
   3. Friction shoes of nylon or other nonabrasive, nonstaining, noncorrosive, durable material.
   4. Limit Devices: Provide concealed limit devices designed to restrict sash or ventilator opening at a distance determined by Architect.

C. Weather-Strip: manufacturer's standard all weather-strip.

D. Thermal Barrier: Rigid, structural thermal barrier that shall transfer shear during bending and promote composite action between the exterior and interior extrusions.
   1. No thermal short circuits are acceptable between the exterior and interior components.
   2. Ensinger's Insulbar, or approved substitution consisting of two glass-reinforced polyamide nylon 6/6 struts mechanically crimped in raceways extruded as part of the exterior and interior extrusions.

2.06 INSECT SCREENS

A. General: Design windows and hardware to accommodate screens in a tight-fitting, removable arrangement, with a minimum of exposed fasteners and latches. Locate screens on inside of window and provide for each operable exterior sash or ventilator. Fabricate insect screens to fully integrate with window frame.
   1. Comply with SMA 1004, "Specifications for Aluminum Tubular Frame Screens for Windows," for minimum standards of appearance, fabrication, attachment of screen fabric, hardware, and accessories unless more stringent requirements are indicated.

B. Aluminum Insect Screen Frames: Manufacturer's standard aluminum alloy complying with SMA 1004. Fabricate frames with mitered or coped joints or corner extrusions, concealed fasteners, and removable PVC spline/anchor concealing edge of frame.
   1. Extruded-Aluminum or Aluminum Tubular Framing Sections and Cross Braces: Not less than 0.040-inch wall thickness.
   2. Finish and Color: Match aluminum window.

C. Aluminum Wire Fabric: 18-by-16 mesh of 0.011-inch- diameter, coated aluminum wire.
   1. Wire-Fabric Finish: Gunmetal

2.07 INSTALLATION ACCESSORIES
A. Material: extruded aluminum; nominal .062” wall; with exposed surfaces finished to match window color and finish performance; concealed fasteners; required weatherseals; designed for unrestricted expansion and contraction.

B. Interior: two-piece snap trim as shown

C. Subframe, and sill extensions, column covers, closures as shown.

2.08  FABRICATION

A. General: Fabricate aluminum windows, in sizes indicated, that comply with NAFS for performance class and performance grade indicated. Include a complete system for assembling components and anchoring windows.

B. Fabricate aluminum windows that are reglazable without dismantling sash or ventilator framing.

C. Thermally Improved Construction: Fabricate aluminum windows with an integral, concealed, low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.
   1. Provide thermal-break construction that has been in use for not less than three years and has been tested to demonstrate resistance to thermal conductance and condensation and to show adequate strength and security of glass retention.
   2. Provide thermal barriers tested according to AAMA 505; determine the allowable design shear flow per the appendix in AAMA 505.

D. Weather Stripping: Provide full-perimeter weather stripping for each operable sash and ventilator.

E. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
   1. Water control: pressure equalization gasket on vent interior; tubular sill with weeps and flap covers to allow water to drain by gravity and resist wind-driven water.

F. Factory-Glazed Fabrication: Glaze aluminum windows in the factory. Comply with requirements in Division 08 Section "Glazing" and with NAFS.

G. Subframes: Provide subframes with anchors for window units as shown, of profile and dimensions indicated but not less than 0.062-inch-thick extruded aluminum. Finish to match window units. Provide subframes capable of withstanding design loads of window units.
   1. Manufacturer’s standard receptors and subsill fabricated with integral factory-applied end dams.

H. Mullions/ Column Covers: Provide Mullions and covers that match profiles as detailed on Drawings.

2.09  FINISHES

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

B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
C. Organic Finish: AA-C12C42R1x High-Performance finish on interior and exterior surfaces.
   1. Chemical Finish: cleaned with inhibited chemicals; acid-chromate-fluoride-phosphate conversion coating
   2. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.
   3. Colors: Custom color yellow. Basis of Design - EFCO Golden Rod. Color on the exterior shall be the same as on the interior.

END OF SECTION 08 5113
SECTION 08 7100 – DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes commercial door hardware for the following:
   1. Swinging doors.
   2. 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. Cylinders specified for doors in other sections.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
   6. NFPA 105 - Installation of Smoke Door Assemblies.
   7. State Building Codes, Local Amendments.

D. Standards: All hardware specified herein shall comply with the following industry standards:
   1. ANSI/BHMA Certified Product Standards - A156 Series
   2. UL10C – Positive Pressure Fire Tests of Door Assemblies

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:

C. 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.
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 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity, unless otherwise indicated:
   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 where indicated in the Hardware Sets or on Drawings:
   a. Non-removable Pins: 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. Acceptable Manufacturers:
   a. Bommer Industries (BO).
   b. Hager Companies (HA).
   c. McKinney Products (MK).

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 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. Acceptable Manufacturers:
   a. Bommer Industries (BO).
   b. McKinney Products (MK).
   c. Pemko Manufacturing (PE).

2.3 POWER TRANSFER DEVICES

A. Electrified Quick Connect Transfer Hinges: Provide electrified transfer hinges 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. Acceptable Manufacturers:
      a. McKinney Products (MK) - QC (# wires) Option.

B. 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. Acceptable Manufacturers:
      a. Pemko Manufacturing (PE) – EL-CEPT Series.
      b. Securitron (SU) - EL-CEPT Series.

C. 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:
      b. McKinney Products (MK) - Connector Hand Tool: QC-R003.

2. Acceptable Manufacturers:

2.4 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
1. Manual flush bolts to be furnished with top rod of sufficient length to allow bolt 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. Acceptable Manufacturers:
   a. Burns Manufacturing (BU).
   b. Rockwood Manufacturing (RO).
   c. Trimco (TC).

B. Door Push Plates and Pulls: ANS/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.

2. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.

3. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.

4. Acceptable Manufacturers:
   a. Burns Manufacturing (BU).
   b. Rockwood Manufacturing (RO).
   c. Trimco (TC).

2.5 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. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.

C. Cylinders (INTERIOR): Original manufacturer cylinders complying with the following:

1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.

2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.

3. Bored-Lock Type: Cylinders with tailpieces to suit locks.

4. 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.


D. Permanent Cores (EXTERIOR): Manufacturer's standard; finish face to match lockset; complying with the following:
1. Removable Cores: Core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware. Provide removable core (small or large format) as specified in Hardware Sets.

E. High Security Cylinders (EXTERIOR): ANSI/BHMA A156.5, Grade 1, patented high security cylinders and keys able to be used together under the same facility master or grandmaster key system. Provide UL437 certified high security cylinders, employing a utility patented locking mechanism requiring the use of a patented key and pick resistance; cylinders are to be factory keyed.

   1. Acceptable Manufacturers:
      a. Schlage.
      b. No Substitution.

F. Keying System: Each type of lock and cylinders to be factory keyed.

   1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
   2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
   3. Existing System: Key locks to Owner's existing system.

G. 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).

H. Construction Keying: Provide construction master keyed cylinders.

I. Construction Keying: Provide temporary keyed construction cores.

J. 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.

K. 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. Acceptable Manufacturers:
      a. Lund Equipment (LU).
      b. MMF Industries (MM).
      c. Telkee (TK).
L. Key Control Software: Provide one network version of "Key Wizard" branded key management software package that includes one year of technical support and upgrades to software at no charge. Provide factory key system formatted for importing into "Key Wizard" software.

2.6 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.

1. Acceptable Manufacturers:
   a. Schlage.
   b. No Substitution.

B. Tubular Locksets, Grade 1 (Extra-Heavy Duty): ANSI 156.2 Series 4000, Grade 1 certified.

1. Locksets to withstand 3000 inch pounds of torque applied to the locked lever without gaining access.

2. Locksets to fit a standard 2 1/8" bore without the use of through-bolts.

3. Lever handles to be made of solid material with no plastic fillers.

4. Latchbolt head to be one-piece stainless steel construction encased within the lock body.

5. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.2 requirements to 20 million cycles


7. Acceptable Manufacturers:
   a. Corbin Russwin Hardware (RU) – CL3100 Series.
   b. No Substitution.

2.7 INTEGRATED WIEGAND OUTPUT LOCKING DEVICES – MULTI-CLASS READER

A. Integrated Wiegand Output Multi-Class Cylindrical Locks: Wiegand output ANSI A156.2, Grade 1, Cylindrical Lockset with integrated card reader and request-to-exit signaling in one complete unit. Hard wired, solenoid driven locking/unlocking control of the lever handle trim with 1/2" deadlocking stainless steel latch. Lock is U.L listed and labeled for use on up to 3 hour fire rated openings.

1. Open architecture, hard wired platform supports centralized control of locking units with new or existing Wiegand compatible access control systems. Inside lever handle (request-to-exit) signaling standard with door position (open/closed status) monitoring (via separately connected DPS).

2. Integrated reader supports the following credentials:
   a. 125kHz proximity credentials: HID, AWID, Indala, and EM4102.
b. 13.56 MHz proximity credentials: HID iClass, HID iClass SE, SE for MIFARE Classic, DESFire EV1.

3. 12VDC external power supply required for reader and lock, with optional 24VDC lock solenoid. Fail safe or fail secure options.

4. Installation requires only one cable run from the lock to the access control panel without requirements for additional proprietary lock panel interface boards or modules.

5. Installation to include manufacturer's access control panel interface board or module where required for Wiegand output protocol.

6. Acceptable Manufacturers:
   a. Schlage.

2.8 AUXILIARY LOCKS

A. Cylindrical Deadlocks: ANSI/BHMA A156.5, Grade 1, cylindrical type deadlocks to fit standard ANSI 161 preparation and 1 3/8" to 1 3/4" thickness doors. Provide tapered collars to resist vandalism and 1" throw solid steel bolt with hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other locksets.

   1. Acceptable Manufacturers:
      a. Schlage
      b. No Substitution.

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:

   2. Strikes for Bored Locks and Latches: BHMA A156.2.
   3. Strikes for Auxiliary Deadlocks: BHMA A156.5.
   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. 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.

2. 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.

3. 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.

4. 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.

5. 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.

6. Electromechanical Options: Subject to same compliance standards and requirements as mechanical exit devices, electrified devices to be of type and design as specified in hardware sets. Include any specific controllers when conventional power supplies are not sufficient to provide the proper inrush current.

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.


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 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. Acceptable Manufacturers:
   a. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
   b. Sargent Manufacturing (SA) - 80 Series.
C. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish.
   1. Provide keyed removable feature where specified in the Hardware Sets.
   2. Provide stabilizers and mounting brackets as required.
   3. Provide electrical quick connection wiring options as specified in the hardware sets.
   4. Acceptable Manufacturers:
      a. Corbin Russwin Hardware (RU) - 700/900 Series.
      b. Sargent Manufacturing (SA) - 980S Series.

2.11 INTEGRATED WIEGAND OUTPUT EXIT DEVICES – MULTI-CLASS READER

A. Integrated Wiegand Output Multi-Class Exit Hardware: Wiegand output ANSI 156.3 Grade 1 rim, mortise, and vertical rod exit device hardware with integrated proximity card reader, latchbolt and touchbar monitoring, and request-to-exit signaling, in one complete unit. Hard wired, solenoid driven locking/unlocking control of the lever handle exit trim with 3/4" throw latch bolt. U.L listed and labeled for either panic or "fire exit hardware" for use on up to 3 hour fire rated openings. Available with or without keyed high security cylinder override.

   1. Open architecture, hard wired platform supports centralized control of locking units with new or existing Wiegand compatible access control systems. Inside push bar (request-to-exit) signaling and door position (open/closed status) monitoring (via separately connected DPS).
   2. Integrated reader supports the following credentials:
      a. 125kHz proximity credentials: HID, AWID, Indala, and EM4102.
      b. 13.56 MHz proximity credentials: HID iClass, HID iClass SE, SE for MIFARE Classic, DESFire EV1.
   3. 12VDC external power supply required for reader. 24VDC required for solenoid operated exit trim. Fail safe or fail secure options.
   4. Installation requires only one cable run from the exit hardware to the access control panel without requirements for additional proprietary lock panel interface boards or modules.
   5. Competitor Alternates Allowed Option>Installation to include manufacturer's access control panel interface board or module where required for Wiegand output protocol.
   6. Acceptable Manufacturers:
      a. Schlage
      b. Sargent Manufacturing (SA) – M1 80 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 including installation and adjusting information on inside of cover.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.

4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.

5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates, and through-bolt and security type fasteners as required for proper installation.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 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. Acceptable Manufacturers:
   a. Corbin Russwin Hardware (RU) – DC6000 Series.
   b. Sargent Manufacturing (SA) - 351 Series.
   c. Norton Door Controls (NO) - 7500 Series.

2.13 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. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
   a. Stainless Steel: 300 grade, 050-inch thick.
4. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

5. Acceptable Manufacturers:
   a. Burns Manufacturing (BU).
   b. Rockwood Manufacturing (RO).
   c. Trimco (TC).

2.14 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 certified 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. Acceptable Manufacturers:
      a. Burns Manufacturing (BU).
      b. Rockwood Manufacturing (RO).
      c. Trimco (TC).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified 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. Acceptable Manufacturers:
      a. Rixson Door Controls (RF).
      b. Rockwood Manufacturing (RO).
      c. Sargent Manufacturing (SA).

2.15 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 UBC 7-2, 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. Acceptable Manufacturers:
   1. National Guard Products (NG).
   2. Pemko Manufacturing (PE).

2.16 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. Acceptable Manufacturers:
      a. Sargent Manufacturing (SA) – 3280 Series.
      b. Securitron (SU) - DPS Series.

B. Wiegand Test Unit: Test unit verifies proper Wiegand output integrated card reader lock installation in the field by testing for proper wiring, card reader data integrity, and lock functionality including lock/unlock, door position, and request-to-exit status. 12 or 24VDC voltage adjustable operating as Fail Safe or Fail Secure.

   1. Acceptable Manufacturers:
      a. Corbin Russwin Hardware (RU) - WT1 Wiegand Test Unit.
      b. Sargent Manufacturing (SA) - WT1 Wiegand Test Unit.

C. Power Supplies: Provide Nationally Recognized Testing Laboratory Listed 12VDC or 24VDC (field selectable) filtered and regulated power supplies. Include battery backup option with integral battery charging capability in addition to operating the DC load in event of line voltage failure. 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.

   1. Acceptable Manufacturers:
      a. Corbin Russwin Hardware (RU) – 782.
      b. Securitron (SU) - BPS Series.
2.17 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.

2.18 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.

END OF SECTION 087100
SECTION 08 8000 – GLAZING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections:
   1. Windows.
   2. Doors.
   3. Glazed entrances and storefront systems.
   4. Interior borrowed lites.

PART 2 - PRODUCTS

2.01 GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
   1. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.

B. Strength:
   1. Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article.
   2. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article.
   3. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
   1. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick.
   2. For laminated-glass lites, properties are based on products of construction indicated.
   3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
   4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F .
   5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
   6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.02 GLASS PRODUCTS

A. Annealed Float Glass: ASTM C 1036, Type I (transparent glass, flat), Quality q3 (glazing select); Class I (clear) unless otherwise indicated.
B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.
   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
   2. Provide Kind HS (heat-strengthened) float glass to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part I "Performance Requirements" Article.
   3. For uncoated glass, comply with requirements for Condition A.
   4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
   5. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated.
   6. Provide 5/16” Kind FT (fully tempered) and Laminated clear safety glass where indicated on drawings.

C. Sputter-Coated Float Glass: ASTM C 1376, float glass with metallic-oxide or -nitride coating deposited by vacuum deposition process after manufacture and heat treatment (if any), and complying with other requirements specified.
   1. Provide Solarban 60 by PPG Industries, Inc. comply with the following physical properties:
      b. U-Value Winter/Summer: 0.29.
      c. Shading Coefficient: 0.44.
      d. Outdoor Visible Light Reflectance: 12 percent.

D. Spandrel Float Glass: Float glass complying with other requirements specified and with the following:
   1. Fallout Resistance: Provide spandrel units identical to those passing the fallout-resistance test for spandrel glass specified in ASTM C 1048.
   2. 1/4 –in clear HS or FT glass with spandrel coating in color indicated on drawings.

E. Sputter Coated Spandrel Glass: ASTM C 1048, Condition B (spandrel glass, one surface sputter coated), Type I (transparent flat glass), Quality-Q3, and complying with other requirements specified.
   1. Fallout Resistance: Provide spandrel units identical to those passing the fallout-resistance test for spandrel glass specified in ASTM C 1048.

F. Laminated Glass: ASTM C 1172, and complying with other requirements specified and with the following:
   1. Interlayer: Polyvinyl butyral or cured resin of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
      a. For polyvinyl butyral interlayers, laminate lites in autoclave with heat plus pressure.
      b. For cured-resin interlayers, laminate lites with laminated-glass manufacturer's standard cast-in-place and cured-transparent-resin interlayer.
   2. Laminating Process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets.
G. Sound reducing Glass (Glazing Type G6): Complying with requirements for laminated glass and as follows:
   1. Interlayer: 0.060 Saflex clear acoustical PVB by Solutia Inc.
   2. Glass: 1 layer 1/8", 1 layer 1/4", Clear FT or HS as scheduled.

2.03 INSULATING-GLASS UNITS

A. General: Preassembled units consisting of dual-sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and as scheduled.
   1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in "Performance Requirements" Article.
   2. Provide Kind FT (fully tempered) glass lites where safety glass is indicated.
   3. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated in the Insulating-Glass Schedule are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
   4. Sealing System: Dual seal, with primary and secondary sealants as follows:
      a. Manufacturer's standard sealants.
   5. Spacer Specifications: Manufacturer's standard warm edge spacer material and construction.

B. Low-E Insulated-Glass Units: Kind FT (fully tempered) per glazing schedule.
   1. Overall Unit Thickness and Thickness of Each Lite: 1-inch and 1/4-inch.
   2. Interspace Content: Argon
   3. Outdoor Lites: Class 1 (clear) float glass - Kind FT (fully tempered).
   4. Interior Lites: Class 1 (clear) float glass - Kind FT (fully tempered).
   5. Low-E Coating: Solarban 60 on surface 2.

2.04 FIRE-PROTECTION-RATED GLAZING

A. General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to UL 9 or NFPA 252 for door assemblies and NFPA 257 for window assemblies.

B. Fire-Protection Rating: As indicated for the assembly in which glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.

C. Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name; test standard; whether glazing is permitted to be used in doors or openings; if permitted in openings, whether or not glazing has passed the hose-stream test; whether or not glazing meets 450 deg temperature-rise limitation; and the fire-resistance rating in minutes.

D. 60-Minute Film-Faced Ceramic Glazing: Clear, ceramic flat glass; 3/16-inch nominal thickness; faced on one surface with a clear glazing film; complying with testing requirements in 16 CFR 1201 for Category II materials.
   1. Nippon Electric Glass Co., Ltd. (distributed by Technical Glass Products); FireLite NT.
   2. Safti First; SuperLite C/SP.
3. Schott North America, Inc.; Filmed Pyran Platinum F.
4. Vetrotech Saint-Gobain (distributed by R.J. Bridges Corp); SGG Keralite FR-F.

E. 90-Minute Laminated Ceramic Glazing: Laminated glass made from 2 plies of clear, ceramic flat glass; 5/16-inch total nominal thickness; complying with testing requirements in 16 CFR 1201 for Category II materials.
1. Nippon Electric Glass Co., Ltd. (distributed by Technical Glass Products); FireLite Plus.
2. Schott North America, Inc.; Laminated Pyran Platinum L.
3. Vetrotech Saint-Gobain (distributed by R.J. Bridges Corp); SGG Keralite FR-L.

2.05 MISCELLANEOUS GLAZING MATERIALS

A. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock strips, complying with ASTM C 542, black.

B. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:
2. EPDM, ASTM C 864.
4. Thermoplastic polyolefin rubber.
5. Any material indicated above.

C. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated above; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal.

D. General: Provide neutral-curing silicone glazing complying with the following requirements:
1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Comply with ASTM C 920 for liquid-applied chemically neutral-curing silicone sealant type S (single component) and NS (nonsag), and use related for NT (nontraffic) Exposure.

E. Glazing Sealants for Fire-Resistive Glazing Products: Identical to products used in test assemblies to obtain fire-protection rating.

F. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

G. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85, plus or minus 5.

H. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
I. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

J. Miscellaneous Glazing Materials: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

2.06 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.

2.07 MONOLITHIC FLOAT-GLASS UNITS

A. For Glazed Interior Doors, Sidelites, Transoms, and View Windows: Uncoated clear float-glass units Class 1 (clear), Kind FT (fully tempered), 1/4-inch-thick.
   1. Provide specified 3/16-inch-thick fire-rated glazing where indicated on the Drawings.

B. For Spandrel Float Glass: Kind HS (heat-strengthened) typical, or Kind FT (fully tempered) 1/4-inch-thick glazing where indicated on the Drawings.

C. For Single Glazed Interior assemblies, where indicated: Kind FT (fully tempered) as scheduled or required of authority having jurisdiction.
   1. Lites: Uncoated clear or tinted, as scheduled.
      a. Thickness: 1/4-inch min, or as required for size of opening.

END OF SECTION 08 8000
SECTION 08 8300 - MIRRORS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes the following types of silvered flat glass mirrors as wall finish in areas indicated:
   1. Tempered glass mirrors qualifying as safety glazing.

B. Related Sections:
   1. Division 10 Section "Toilet, Bath, and Laundry Accessories" for metal-framed mirrors.

PART 2 - PRODUCTS

2.01 SILVERED FLAT GLASS MIRRORS

A. Glass Mirrors, General: ASTM C 1503.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering
      products that may be incorporated into the Work include, but are not limited to, the
      following:
      a. D & W Incorporated
      b. Donisi Mirror Company.
      c. Gardner Glass, Inc.
      d. Gilded Mirrors, Inc.
      e. Guardian Industries.
      f. Lenoir Mirror Company.
      g. Stroupe Mirror Co., Inc.
      h. Sunshine Mirror; Westshore Glass Corp.
      i. Virginia Mirror Company, Inc.

B. Tempered Clear Glass: Mirror Glazing Quality, for blemish requirements; and comply with
   ASTM C 1048 for Kind FT, Condition A, tempered float glass before silver coating is applied.
   1. Nominal Thickness: 6.0 mm.

2.02 MISCELLANEOUS MATERIALS

A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or
   minus 5.

B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use
   in protecting against silver deterioration at mirrored glass edges.

C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting
   mirrors and certified by both mirror manufacturer and mastic manufacturer as compatible with
   glass coating and substrates on which mirrors will be installed.
   1. Franklin International; Titebond Division.
   2. Laurence, C. R. Co., Inc.
3. Macco Adhesives; Liquid Nails Division.
4. OSI Sealants, Inc.
5. Palmer Products Corporation.
7. Royal Adhesives & Sealants; Gunther Mirror Mastics Division.
8. Sommer & Maca Industries, Inc.

2.03 MIRROR HARDWARE

A. Top and Bottom Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover bottom and top edges of mirror assembly.
1. Bottom Trim: J-channels formed with front leg and back leg not less than 3/8 and 7/8 inch in height, respectively, and a thickness of not less than 0.04 inch.
   c. Sommer & Maca Industries, Inc.; Heavy Gauge Aluminum Shallow Nose "J" Moulding Lower Bar.
2. Top Trim: J-channels formed with front leg and back leg not less than 5/8 and 1 inch in height, respectively, and a thickness of not less than 0.04 inch.

2.04 FABRICATION

A. Mirror Sizes: To suit Project conditions, and before tempering, cut mirrors to final sizes and shapes.
B. Cutouts: Fabricate cutouts before tempering for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrors.
C. Mirror Edge Treatment: Flat polished.
   1. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

2.05 VINYL LETTERING

A. Provide 3” high vinyl lettering to read “WASH YOUR PAWS” on each of the mirrors at the following locations.
1. Rooms B020(Hallway B018), B005(Hallway B003) B105, B106, C005, C006, C105 and C106.
B. Provide School “Paw” logo on both sides of the text. Logo digital image shall be provided by the Owner.

C. Locate the text and logos centered on the mirror and at 6” below the top edge of the mirror.

END OF SECTION 08 8300
SECTION 09 2116 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Interior gypsum board.
   2. Tile backing panels.
   3. Non-structural steel framing members for the following applications:
      a. Furring and partitions,
      b. Framed and suspended soffits, bulkheads and ceilings.
   4. Sound attenuation insulation

B. Related Sections include the following:
   1. Division 05 Section “Structural Metal Stud Framing” for non-load and load-bearing LGMF steel framing, exterior gypsum sheathing.
   2. Division 06 Section “Miscellaneous Rough Carpentry” for wood blocking and furring.

PART 2 - PRODUCTS

2.01 PANELS, GENERAL

A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. G-P Gypsum.
      c. USG Corporation.

   2. Metal Framing and Accessories:
      a. ClarkDietrich Building Systems
      b. MarinoWare.
      c. The Steel Network

2.02 INTERIOR GYPSUM BOARD

A. General: Complying with ASTM C 1396, as applicable to type of gypsum board indicated.

B. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

C. Shaft-Wall Assemblies: Provide materials and components complying with requirements of fire-resistance-rated assemblies indicated.
   1. Provide panels in maximum lengths available to eliminate or minimize end-to-end butt joints.
   2. Provide auxiliary materials complying with gypsum board shaft-wall assembly manufacturer's written recommendations.
D. Regular Type:
1. Thickness: 5/8 inch Type X, unless otherwise indicated.
2. Long Edges: Tapered.
3. Locations: Vertical surfaces, as indicated in Part 3 "Panel Application" Article, unless otherwise indicated.

E. Type Firecode ‘C’:
1. Thickness: 5/8 inch.
2. Long Edges: Tapered.
3. Location: Where required for fire-resistance-rated assembly.

F. Sag-Resistant Gypsum Wallboard: ASTM C 1396, manufactured to have more sag resistance than regular-type gypsum board.
1. Thickness: 1/2 inch or as indicated.
2. Long Edges: Tapered.
3. Locations: Ceiling surfaces.

G. Flexible Gypsum Wallboard: ASTM C 1396, manufactured to bend to fit tight radii and to be more flexible than standard regular-type panels of the same thickness.
1. Thickness: 1/4 inch.
2. Long Edges: Tapered.
3. Locations: Where required for curved surfaces

H. Abuse-Resistant Gypsum Wallboard:
1. ASTM C 1629 "Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels", complying with the following Performance Requirements:
   a. Surface Abrasion: Level 2 minimum
   b. Indentation: Level 1 minimum
   c. Soft-Body Impact: Level 1 minimum
2. Products: Subject to compliance with requirements, provide the following:
   a. G-P Gypsum; ToughRock AR Abuse Resistant Gypsum.
   c. United States Gypsum Co.; Sheetrock AR Abuse Resistant Panels.
   d. CertainTeed; ProRoc AR Panel Abuse-Resistant Board.
3. Core: 5/8 inch, regular type.
5. Locations: Vertical surfaces, as indicated in Part 3 "Panel Application" Article, unless otherwise indicated.

I. Impact-Resistant Gypsum Wallboard with Moisture, Mold, Mildew Resistant Performance:
2. ASTM C 1629 "Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels", complying with the following Performance Requirements:
   a. Surface Abrasion: Level 2 minimum
   b. Indentation: Level 1 minimum
   c. Soft-Body Impact: Level 3 minimum
   d. Hard-Body Impact per Annex A.1: Level 3 minimum
3. Acceptable Products:
   a. United States Gypsum Co.; Sheetrock Brand Mold Tough VHI Gypsum Panel
   b. CertainTeed; ProRoc Extreme Impact Panel
   c. National Gypsum; Hi-Impact XP Panel
   d. Continental; Protecta HIR 300 Panel

4. Locations: Vertical surfaces, as indicated in Part 3 "Panel Application" Article, unless otherwise indicated.

J. Gypsum Liner Panels: Comply with ASTM C 442/C 442M.
   1. Moisture- and Mold-Resistant Type X: Manufacturer's proprietary liner panels with moisture- and mold-resistant core and surfaces; comply with ASTM D 3273.
      a. Core: 1 inch thick.
      b. Long Edges: Double bevel.

2.03 TILE BACKING PANELS

A. Water-Resistant Backing Board: Minimum 1/2-inch-thick, Complying with ASTM C 1278/ C 1178
   1. DensShield Tile Guard by G-P Gypsum
   2. Durock Brand Glass-Mat Tile Backerboard by USG.

B. Board Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

2.04 TRIM ACCESSORIES

A. Subject to compliance with requirements, provide drywall trims and accessories by manufacturer specified in Article 2.01, except as otherwise indicated.

   1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
   2. Shapes:
      a. Cornerbead, metal.
         1) Curved-Edge Cornerbead: With notched or flexible flanges, metal.
      b. Bullnose bead, metal.
      c. LC-Bead: J-shaped; exposed long flange receives joint compound, plastic.
      d. U-Bead: J-shaped; exposed short flange does not receive joint compound, plastic.
      e. Expansion (control) joint, plastic.

   1. Material: Hot-dip galvanized steel sheet, plastic, or rolled zinc.
   2. Shapes:
      a. Cornerbead, metal.
      b. LC-Bead: J-shaped; exposed long flange receives joint compound, plastic.
      c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening, plastic.
D. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Fry Reglet Corp.
   b. Gordon, Inc.
   c. Pittcon Industries.
2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.
3. Finish: Class II clear anodic.

2.05 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475.

B. Joint Tape:
1. Interior Gypsum Wallboard: Paper.
2. Abuse Resistant Gypsum Board: As recommended by panel manufacturer.
4. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
   a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use drying-type, sandable topping compound.
4. Finish Coat: For third coat, use drying-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use drying-type, sandable all-purpose joint compound and/or high-build interior coating product designed for application by airless sprayer and to be used instead of skim coat to produce Level 5 finish, to thickness as recommended by manufacturer.

D. Joint Compound for Exterior Applications:
1. Glass-Mat Gypsum Sheathing Board: As recommended by sheathing board manufacturer.

E. Joint Compound for Tile Backing Panels: As recommended by backing panel manufacturer.
2.06 ACOUSTICAL SEALANT

A. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

2.07 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
   1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Patching Compound: One-component gypsum veneer plaster, ASTM C 587 and formulated for application directly over substrate indicated without use of separate base-coat material.

C. Gypsum Base for Veneer Plaster: ASTM C 1396 and products of same manufacturer as plaster, regular type, 1/2-inch-thick.

D. SAFB: Mineral fiber Sound Attenuation Fire Blankets with an STC 49 rating and defined as “noncombustible” by NFPA Standard 220 when tested according to ASTM E 136. Provide Thermafiber SAFB Blanket by Thermafiber LLC or equal.

E. Fire Blocking: Mineral fiber tested in accordance with ASTM E 119 for up to 3 hour rating, having a density of 2.5 – 3.0 lbs/cu.ft. Provide Thermafiber Insulation by Thermafiber LLC.

F. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
   1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

G. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
   1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.

H. Track Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on partition or shaftwall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.
   1. 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 testing agency.
   2. 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 testing agency.

I. Isolation Strip at Exterior Walls: Provide one of the following:
   1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
   2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.
J. Corner Guards: For finishing wall edges at corners, decorative edge protection profile for outside corners where indicated on the drawings.
   1. Rondec-AE by Schluter; aluminum, satin nickel anodized finish.

K. Acoustical Sealant: As specified in Division 07 Section "Joint Sealants."

L. Thermal Insulation: As specified in Division 07 Section "Thermal Insulation."

2.08 SOUND ATTENUATION INSULATION

A. Provide unfaced slag-wool-fiber/rock-wool-fiber or unfaced fiberglass batts or cellulos.

B. Unfaced, Slag-Wool-Fiber/Rock-Wool-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics. Subject to specified requirements, provide products by one of the following manufacturers, or as otherwise approved by Architect.
   1. Fibrex Insulations Inc.
   2. Owens Corning.
   3. Thermafiber.

C. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics. Subject to specified requirements, provide products by one of the following manufacturers, or as otherwise approved by Architect.
   1. CertainTeed Corporation.
   2. Guardian Fiberglass, Inc.
   4. Knauf Fiber Glass.
   5. Owens Corning.

2.09 NON-STRUCTURAL STEEL FRAMING, GENERAL

A. Framing Members, General: Comply with ASTM C 645 for conditions indicated.
   1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal, unless otherwise indicated.

   2. Protective Coating: Comply with ASTM C 645; roll-formed from hot-dipped galvanized steel; complying with ASTM A 653 G40 or having a coating that provides equivalent corrosion resistance. A40 galvannealed products are not acceptable.
      a. Coatings shall demonstrate equivalent corrosion resistance with an evaluation report acceptable to the authority having jurisdiction.
2.10 SUSPENSION SYSTEM COMPONENTS

A. Tie Wire: ASTM A 641, Class 1 zinc coating, soft temper, 0.0625-inch-diameter wire, or double strand of 0.0475-inch-diameter wire.

B. Hanger Attachments to Concrete:
   1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.
      a. Type: Postinstalled, chemical anchor and/or postinstalled, expansion anchor.
   2. Powder-Actuated Fasteners: Suitable for concrete attachment, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.

C. Hangers:
   1. Wire Hangers: ASTM A 641, Class 1 zinc coating, soft temper, 0.162-inch diameter.
      a. Diameter: 1/4-inch.
      a. Size: 1 by 3/16 inch by length required. Angle hangers may be required for exterior soffits subject to exceptional uplifts.
      a. Minimum Base Metal Thickness: 0.0312 inch.

D. Carrying Channels: steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch-wide flanges with manufacturer's standard corrosion-resistant zinc coating.
   1. Depth 1-1/2 inches.

E. Furring Channels (Furring Members): Commercial-steel sheet with manufacturer's standard corrosion-resistant zinc coating.
   1. Channels: 0.0538-inch bare-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
      b. Minimum Base Metal Thickness: 0.019 inch

F. Grid Suspension System for Ceilings: ASTM C 645-07, direct-hung heavy duty system composed of main beams and cross-furring members that interlock.
   2. Chicago Metallic Corporation; 660-C Drywall Furring System.
   3. USG Corporation; Drywall Suspension System.
2.11 STEEL FRAMING FOR PARTITION ASSEMBLIES

A. Steel Studs and Runners: ASTM C 645.
   1. Minimum Base Metal Thickness:
      a. For Applying One Layer of Gypsum: 0.0179-inch (25 gage) or members that can show certified third party testing with gypsum board in accordance with ICC ES AC86 (Approved May 2012). The submission of a recognized evaluation report is acceptable to show conformance to this requirement.
      b. For Applying Two Layers of Gypsum: 0.0296 inch (20 gage).
      c. For Applying Abuse Resistant Gypsum and Tile Backer Board, or plywood backer for gypsum board finish: 0.0296 inch (20 gage) or members that can show certified third party testing with gypsum board in accordance with ICC ES AC86 (Approved May 2012). The submission of a recognized evaluation report is acceptable to show conformance to this requirement.

2. Depth: As indicated, or as otherwise approved by Architect.

3. Basis-of-Design product: ClarkDietrich Building Systems ProSTUD 25 or 20 gauge equivalent, as indicated.

4. Curved track where required.
   a. Basis-of-Design product - ClarkDietrich Building Systems Contour Track

B. Deep-Leg Deflection Track: ASTM C 645 top runner with 2-inch-deep flanges.
   1. Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
      a. Designed to be installed with studs friction fit into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.

2. Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, same manufacturer as steel studs or the following:
   a. Steel Network Inc.; VertiClip SLD or VTD Series, as appropriate for application.
   b. ClarkDietrich Building Systems Fast Top Clip.

C. Deflection Track Slotted: Manufacturer’s single, deep-leg, U-shaped steel track: punched with vertical slots in both legs.

D. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
   1. Fire Trak Corp.; Fire Trak attached to studs with Fire Trak Slip Clip.
   3. ClarkDietrich Building Systems BlazeFrame Firestop Track.

E. Backup Clip at Structural Steel Framing: Shaped galvanized flange clips.
   1. The Claw

F. Backing Plate: Sheet for blocking and bracing in length and width indicated.
   1. Basis-of-Design products: ClarkDietrich Building Systems; Danback Fire Treated Wood Backing Plate D16F or D24F.
G. Channel Bridging: 0.0538-inch bare-steel thickness, with minimum 1/2-inch-wide flanges.
   1. Depth: 1-1/2 inches.
   2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch thick, galvanized steel.
   3. Basis-of-Design products:
      a. ClarkDietrich Building Systems: Spazzer 9200 Bridging and Bracing Bar
      b. U-Channel Assembly: Size as recommended by manufacturer for specific application, with EasyClip U-Series Clip Angle or equivalent.

H. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
   1. Minimum Base Metal Thickness: 0.0296 inch, or members that can show certified third party testing with gypsum board in accordance with ICC ES AC86 (Approved May 2012). The submission of a recognized evaluation report is acceptable to show conformance to this requirement.
   2. Depth: 7/8 inch.
   3. Basis-of-design product: ClarkDietrich Building Systems; ProSTUD 20 gauge equivalent.

I. Furring Channels: 0.0538-inch bare-steel thickness, with minimum 1/2-inch-wide flanges.
   1. Depth: 3/4 inch.
   2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum bare-steel thickness of 0.0296 inch.
   3. Tie Wire: ASTM A 641, Class 1 zinc coating, soft temper, 0.0625-inch-diameter wire, or double strand of 0.0475-inch-diameter wire.

J. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.
   1. Configuration: Asymmetrical or hat shaped.
   2. Subject to compliance with requirements, suggested product - ClarkDietrich Building Systems: RC Deluxe Resilient Channel (RCSD).

K. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum bare-metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.
   1. ClarkDietrich Building Systems; Z-Furring Channel.

L. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

M. Sound-Isolation Clips: Screwed to studs to support vertical furring channels, to isolate finish gypsum board from partition structure assembly.
   1. RSIC Resilient Sound Isolation Clips distributed by ClarkDietrich Building System, Warren, Ohio, or Iso-Max Sound Isolation Clips by Kinetics Noise Control, Dublin, Ohio.
      a. Description: Rubber element into which a standard galvanized steel furring channel, 7/8 in. x 25 gauge, is captured. The channel legs snap into the rubber element without any metal-to-metal or other contact with rigid building elements.
      b. The isolation clip is attached to the wall/ceiling framing or other structural substrate through galvanized steel brackets on each side of the rubber isolation element. The brackets shall be of sufficient strength to carry the wall or ceiling weight without bending or failure.
c. Spacing and location of sound isolation clips shall be determined by the manufacturer based on wall or ceiling type. Installation drawing details shall be provided by the manufacturer to assure optimum sound control and structural integrity of the system.

2. Design and install for final assembly minimum STC of 57

END OF SECTION 09 2116
SECTION 09 3000 - TILING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Ceramic floor and wall tile
   2. Stone saddle thresholds
   3. Metal trim and edging installed as part of tile installations
   4. Installation accessories and materials
      a. Crack-suppression membrane for thin-set tile installations.
      b. Waterproofing membranes for thin-set and mortar-bed set tile installations.
      c. Underlayment and patching materials
      d. Mortars and Grout
   5. Protection and maintenance

B. Related Sections include the following:
   1. Division 03 Section "Cast-in-Place Concrete" for monolithic slab finishes specified for tile substrates and for cementitious underlayment and repair.
   2. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
   3. Division 09 Section "Gypsum Board Assemblies" for tile backing panels.
   4. Division 09 Section "Terrazzo Tile Flooring" for resilient terrazzo floor tile.

PART 2 - PRODUCTS

2.01 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard:
   1. Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
   2. Provide tile complying with Standard grade requirements, unless otherwise indicated.
   3. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.

B. Colors, Textures, and Patterns: Where manufacturer's selected products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:
   1. As indicated by manufacturer's designations in finish and color schedule on the Drawings.

C. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.

E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

F. Bullnose Edge: At any condition where wall tile ends and the edges are exposed, provide bullnose edges on top and/or top and sides.

2.02 CERAMIC TILE PRODUCTS

A. Basis of Design Manufacturers: As scheduled on Drawings.
   1. Colors and Styles: Manufacturer's designations per Color Schedule on Drawings.

B. Unglazed Mosaic Ceramic Floor Tile (UGCT 1-4): Factory-mounted flat tile as follows:
   1. Composition: Impervious porcelain, water absorption non exceeding 0.5 percent.
   2. Module Size: 12 by 12 inches
   3. Tile Sizes: 2x2 as scheduled.
   5. Nominal Thickness: 1/4 inch.
   6. Face: Plain with cushion edges.
   7. Surface: Slip-resistant, with abrasive admixture, Dynamic COF at least 60 (wet).

C. Unglazed Ceramic Wall Tile (CT1-2): Flat tile as follows:
   1. Composition: Impervious porcelain, water absorption non exceeding 0.5 percent.
   2. Nominal Sizes: As scheduled and indicated on Wall Graphics Drawings

D. Ceramic Wall Tile(CT3-5): Flat decorative tile as follows:
   1. Composition: Glazed vitreous or non-vitreous natural clay or porcelain, with water absorption not exceeding 20 percent.
   2. Surface: Smooth, without abrasive admixture.
   5. Face: Plain with cushion edges.
   6. Finish: Plain, Matte or Clear glaze, as scheduled.

E. Trim Units: As scheduled and detailed, matching characteristics of adjoining flat tile and coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes selected from manufacturer's standard shapes:
   1. Colors: Manufacturer's designations per Color Schedule on Drawings, except as otherwise indicated.
   2. For base cap, wainscot cap, edge trim and outside corners, except as otherwise indicated, provide aluminum Metal Edge Trim.
      a. In Kitchen, Kitchen Storage and Dishwashing areas as indicated provide stainless steel Metal Edge Trim
   3. Internal Corners: Field-butted square corners with field-applied flexible sealant per Division 07 Section “Joint Sealants.”
      a. Exception: coved base and cap angle pieces designed to fit with stretcher shapes.
4. Build-up Mosaic Tile Base (UCTB1): Thinset floor tile trim units as indicated on Drawing.

5. Mosaic Floor Tile Trim Units, Thin-Set Mortar Installations:
   a. Base Cove: Cove, module size 2 by 2 inch.
      1) External Base Cove Corners, module size 2 by 2 inch.
      2) Internal Base Cove Corners, module size 2 by 2 inch.

6. Glazed or Unglazed Decorative Wall Tile, Thin-Set Mortar Installations:
   a. Base: Coved or straight, as applicable, with surface top and side edges same as wall tiles, facial dimensions as scheduled.

2.03 METAL CORNER AND EDGE TRIM

A. Aluminum corner edging, side and wainscot cap edge return, for integral installation with new ceramic wall tile finishes, except where otherwise indicated.

B. Stainless Steel outside corner edging, for integral installation with new ceramic wall tile finishes in kitchen areas and where indicated.
   1. Material: Stainless steel, Type 304, Brushed finish.
   2. Wing Size: As detailed.
   3. Mounting: Adhesive supplied or recommended by manufacturer.
   5. For surface-mounted corner edging required in non-tile or retrofit applications, refer to Division 10 Section “Impact-Resistant Wall Protection.”

2.04 WATERPROOFING AND CRACK-SUPPRESSION MEMBRANE FOR THIN-SET TILE INSTALLATIONS

A. General: Provide waterproofing membrane for toilet rooms, and as otherwise indicated. Provide crack isolation membrane as directed by tile manufacturer, and ANSI A 108.
   1. Verify acceptance with local plumbing authority having jurisdiction, of products and application methods for waterproofing membranes used at elevated slabs where clamping into drains. Coordinate with floor drain installer.

B. Fluid-Applied Membrane: ANSI A118.10 and A118.12 ready-to-use, elastomeric polymer waterproofing and crack prevention membrane. Provide membrane for all toilet rooms on elevated slabs. For drain tie-ins, corners, changes in plan and individual cracks or saw cuts use manufacturer’s recommend mesh reinforcing fabric or tape.
   1. LATICRETE International Inc. 9235 Waterproofing Membrane
   2. ARDEX; 8+9 Waterproofing Compound
   3. Custom Building Products; Redgard Waterproofing and Crack Prevention Membrane.
   5. TEC; a subsidiary of H. B. Fuller Company; HydraFlex - Waterproofing Crack Isolation Membrane.

C. Crack Isolation Membrane: Chlorinated-polyethylene (CPE), nonplasticized, faced on both sides with high-strength, nonwoven polyester fabric, for adhering to latex-portland cement mortar; 60 inches wide by 0.030-inch nominal thickness.
   1. Product: Noble Company (The); Noblesxel CIS.
2.05 SETTING AND GROUTING MATERIALS

A. Manufacturers:
   1. Custom Building Products.
   2. LATICRETE International Inc.
   3. MAPEI Corporation.
   4. Summitville Tiles, Inc.
   5. Bostik Findley, Inc.
   6. ARDEX;
   7. StarQuartz.

B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:
   1. Prepackaged dry-mortar mix containing dry, redispersible, ethylene vinyl acetate additive to which only water must be added at Project site.
      a. For wall applications, provide nonsagging mortar that complies with Paragraph F-4.6.1 in addition to the other requirements in ANSI A118.4.
      b. Product: CustomFloat Bedding Mortar by Custom Building Products.
   2. Provide white grout for use as glass tile setting bed, as recommended by manufacturer.

C. Pre-blended non-slump mortar for use with simulated dry-stacked stone, for application over cement-board tile backer, can be applied up to 2" thick without shrinking, checking or cracking
   1. Premium PCL Stone Veneer Mortar by Custom Building Products Thin Veneer Installation System

D. Fast-setting preblended underlayment specifically designed as a flexible bonding substrate for thinset ceramic tile, capable of bridging cracks and trowelable to a feather edge.
   1. MegaFlex Crack Prevention Mortar by Custom Building Products.

E. Standard Unsanded Cement Grout: ANSI A118.6, color as indicated.
   1. Unsanded grout mixture is for joints 1/8 inch and narrower and joints in glazed tile.

F. Standard Sanded Cement Grout: ANSI A118.6, color as indicated.

G. Polymer-Modified Tile Grout: ANSI A118.7.
   1. Precoat porous tile surfaces with manufacturer’s recommended temporary protective coating prior to grouting.

H. Urethane Grout Materials: Chemical-Resistant, Water-Cleanable, Tile-Setting and Grouting, as specified below. All urethane grout applications shall be considered as Stain Resistant and Wet applications when determining the manufacturer’s installation requirements.
   1. Pre-mixed, single-part, pigment-free grout.
   2. Physical and chemical properties: Per manufacturer’s standard product component specifications.
   3. Accelerators: StarCure Accelerator for wet and stain resistant applications, and where required for accelerated curing.
   4. Shelf Life: Do not use epoxy components after 3 years from manufacturing date
5. Disposal: Dispose of waste in accordance with all manufacturer’s recommendations, MSDS requirements, and applicable laws.

6. Cure Time: Do not apply grout when temperature is below 40 degrees F. Allow grout to cure as follows or as otherwise required by the manufacturer at the time of the application of the product:
   a. Working time: 4hrs.
   b. Light and heavy foot traffic: 48 hrs.
   c. For stain-resistant applications, 72 hrs.
   d. For wet areas: 168 hours.

7. Colors: per Color Schedule on Drawings.

2.06 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Flooring Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications, white zinc alloy, nickel silver, or stainless steel; ASTM A 666, 300 Series exposed-edge material.

C. Marble Thresholds (Floor Saddle) – ASTM C503: White Carrera, w/ minimum abrasion resistance of 10 per ASTM C 1353 or ASTM C 241 and with honed finish.: Fabricate to sizes and profiles indicated, or as otherwise required to provide accessible transitions between adjacent floor finishes.
   1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch or less above adjacent floor surface.
   2. Description: Uniform, fine-to-medium-grained whitestone with gray veining.

D. Temporary Protective Coating: Product formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
   1. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

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

F. Grout Sealer: Manufacturer's recommended product for sealing grout joints and unglazed tile from oil-based or water-based stains, and that does not change color or appearance of grout or tile surface.
2.07 MIXING MORTARS AND GROUT

A. Mix mortars and grouts, where applicable, to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives, where applicable, in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

END OF SECTION 09 3000
SECTION 09 5113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes lay-in panels and suspension systems for ceilings.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. In Subject to compliance with requirements, provide one of the products specified or product meeting the requirements by one of the following:
   2. USG Interiors, Inc
   3. CertainTeed

2.02 ACOUSTICAL PANELS, GENERAL

A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
   1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface per ASTM E 795.

B. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
   1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

C. Provide panels complying with ASTM E 1264 for type, form, and pattern indicated.

D. Performance Qualities:
   1. Noise Reduction Coefficient (NRC): ASTM C 423; Classified with UL label on product carton.
   2. Ceiling Attenuation Class (CAC): ASTM C 1414; Classified with UL label on product carton
   4. Flame Spread: ASTM E 1264; Class A (UL)
   6. Products not bearing UL classification for acoustical performance are not acceptable.
E. Coating-Based Antimicrobial Treatment: Provide acoustical panels with face and back surfaces coated with antimicrobial treatment consisting of manufacturer's standard formulation with fungicide added to inhibit growth of mold and mildew and showing no mold or mildew growth when tested according to ASTM D 3273.

2.03 METAL SUSPENSION SYSTEMS, GENERAL

A. Manufacturers:
   1. Chicago Metallic Corporation.
   2. Fry Reglet Corporation.
   3. Ceiling Tile Manufacturer

B. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.

C. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.

D. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.
   1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing per ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
      a. Type: Post-installed expansion anchors.
      b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
   2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.

E. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
   2. 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 0.106-inch-diameter wire.

F. Hanger Rods or Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

G. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.
H. Hold-Down Tile Retention Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches o.c. on all cross tees.

I. Aircraft Cable Hangers, Braces, and Ties: Basis-of-Design Manufacturer’s standard.

2.04 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING IN KITCHEN

A. Wide-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet, prepainted, electrostatically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 coating designation, with prefinished 15/16-inch-wide metal caps on flanges.
   2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
   3. Face Design: Flat, flush.

2.05 METAL EDGE MOLDINGS AND TRIM

A. Provide compatible system and components by ceiling system manufacturer or metal suspension system manufacturer.
   1. Armstrong Axiom Trim System
   2. USG Compasso Suspension Trim
   3. CertainTeed Cloud Perimeter Trim

B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
   1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
   2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
   3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

C. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements and the following:
   1. Aluminum Alloy: Manufacturer’s standard with not less than the strength and durability properties of aluminum extrusions complying with ASTM B 221 for Alloy and Temper 6063-T5.
2.06 ACOUSTICAL SEALANT

A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

B. Acoustical Sealant for Concealed Joints: Manufacturer's standard nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.
SECTION 09 6466 - WOOD ATHLETIC AND PERFORMANCE FLOORING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes wood sports-floor

B. Products installed under this Section furnished under other Sections:
   1. Volleyball inserts and covers, specified under Section 11 6623

PART 2 - PRODUCTS

2.01 MATERIALS

A. Recycled Content: Where practicable, provide composite products manufactured with high recycled content.
   1. Identify materials with recycled content in Contractor’s report on Subcontractor Scope and Product Purchase Review, to increase the likelihood of achieving target points for recycled content.

B. Certified Wood: "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship," and to FSC STD-40-004, "FSC Standard for Chain of Custody Certification."
   1. Other standards acceptable for certification of sustainable sources:
      a. Sustainable Forestry Initiative
      b. Canadian Standards Association
      c. American Tree Farm System
   2. Identify certified materials in Contractor’s report on Subcontractor Scope and Product Purchase Review, to document that a minimum of 50 percent of wood used on the Project, based on dollar value, is FSC certified.

2.02 MANUFACTURERS

A. Gymnasium Floor: Resilient Anchored-Panel System, DIN/8032, Part 2:
   1. Alliance system by Connor Sports Flooring, Inc
   2. Action Aero NR by Action Floor Systems LLC
   3. UltraFlex DC by Aacer Sports Flooring
   4. Eclipse Anchored by Robbins Sports Surfaces

2.03 WOOD FLOORING

A. Strip Flooring: Provide kiln dried, random length, tongue and groove, and end matched wood flooring as follows.
   1. Species and Grade:
      a. Gymnasium: Northern hard maple (Acer saccharum) MFMA-RL Second and Better
1) Exception: For areas under stacked portion of telescoping bleachers that are normally concealed from view, provide Third and Better Grade.

b. Stage: C & BTR - Flooring Douglas fir

2. Cut: Flat grain.

3. Thickness:
   a. Gymnasium: 25/32 inch
   b. Stage: 3/4 inch

4. Face Width: 2-1/4 inches.

5. Backs: Channeled (kerfed) for stress relief.


7. Provide maple strips milled with 1/64-inch side edge crush bead

8. Preservative Treatment: Clear, penetrating, water-repellent wood preservative that protects against mold, mildew, staining, and decay fungi; complying with MFMA's written recommendations and applied by immersion.

2.04 SUBFLOOR SYSTEM

A. Anchored resilient plywood subfloor system:
   1. Plywood subfloor assembly installed on resilient shock-absorbing pads and pinned to concrete substrate, factory assembled in 2 layers, with nailer panels or strips spaced per manufacturer and anchor panels or strips for securing with sleeved floor anchors.

   2. Fasteners (unless otherwise recommended by manufacturer, subject to Architect’s written approval):
      a. Flooring Fasteners – 2-in. barbed cleats or coated staples.
      b. Subfloor Fasteners – 1-in. coated staples and manufacturer-recommended construction adhesive.
      c. Floor pin – Min. 2 1/2-in. steel drive pin with anti-squeak collar.

B. Floating Floor System:
   1. Plywood subfloor, 2 layers, installed on resilient shock-absorbing pads.

C. Preservative Treatment: Clear, penetrating, water-repellent wood preservative that protects against mold, mildew, staining, and decay fungi; complying with MFMA's written recommendations and applied by immersion.

D. Plywood subfloor: DOC PS 1, APA sheathing Exposure 1, C-D Plugged, in thickness indicated or, if not indicated, as recommended by manufacturer for required performance.

E. Resilient Pads: Manufacturer’s recommended pad to achieve performance requirement, installed at manufacturer's standard spacing for product designation indicated above.

2.05 ACCESSORIES

A. Manufacturer's standard custom blocking or shimming for adjustment of flooring system thickness to accommodate variance in depth of floor depression.
B. Vapor Barrier (if required): 2-part liquid-applied, self-leveling moisture remediating overlayment, or as otherwise recommended by flooring manufacturer.

C. Substrate Vapor-emission Retarder: Self-adhering self-healing modified bituminous sheet as follows, or as recommended by flooring manufacturer.
   1. Rubberized asphalt laminated to polyethylene film with release liner on adhesive side and formulated for application with primer on substrate.
   2. Vapor Permeance: 0.05 perms; ASTM E 96, Water Method.
   3. Manufacturers:
      a. Carlisle Coatings & Waterproofing.
      c. Henry Company.
      d. Meadows, W. R., Inc.
      e. Tremco Incorporated;

D. Resilient Wall Base: Molded, vented, rubber or vinyl cove base; 4 by 3 by 48 inches; with preformed outside corners.
   1. Approved manufacturers: Roppe, Johnsonite, R.C. Musson.
   2. Color as scheduled.

E. Thresholds: Extruded aluminum threshold for floor perimeter at door openings or transitions to concrete floor surface.
   1. Pemko 271 low saddle.

F. Fasteners: Type and size recommended by manufacturer, but not less than those recommended by MFMA for application indicated.


H. Adhesives: Manufacturer's standard for application indicated.
   1. Concrete Primers: Manufacturer's standard for application indicated.
   2. Use adhesive and primer, if any, that have a VOC content of 60 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

I. Provide additional wood sleepers and blocking under telescoping bleachers floor area to bear the weight as recommended by the flooring manufacturer. Coordinate location of additional support with bleacher locations.
   1. Provide solid blocking where recommended by flooring manufacturer and stage equipment supplier to accommodate floor-mounted stage equipment and rigging. Coordinate locations.

2.06 WOOD FLOOR FINISH SYSTEM

A. General: Provide system of compatible components for each flooring type as recommended in writing by flooring manufacturer and finish manufacturer, and which is MFMA approved.

B. Clear Finish System at Gym floor:
   1. Type: MFMA Group 3, Gymnasium Type (Surface) Finishes; urethane-oil type.
   2. Floor-Sealer Formulation: Pliable, penetrating type.
   a. Gymnasium Floor: High-gloss sheen finish

4. Game-Line and Marker Paint: Industrial enamel compatible with finish coats and recommended in writing by manufacturers of finish coats, and paint for this use.

5. Chemical Components: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   a. Floor Sealers and Finish Coats: VOC content of not more than 350 g/L.
   b. Game-Line and Marker Paint: VOC content of not more than 150 g/L.

6. 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:
   a. Basic Coatings.
   b. BonaKemi USA, Inc.
   c. Dura Seal Division; Minwax Co., Inc.

C. Clear Finish System at Fir Strip Flooring at Stage:
   1. Type: Products used at hardwood floor.
   2. Stain: Penetrating and nonfading type, color Black.
   3. Floor Sealer: Product used at hardwood floor.
   4. Finish Coats: Formulation used at hardwood floor, except as indicated below.
      a. Performance Area: Low-gloss matte finish
   5. Available Manufacturers: As used at hardwood floor:

D. Wood Filler: Formulated to fill and repair seams, defects, and open-grain hardwood floors; compatible with finish system components and recommended by filler and finish manufacturers for use indicated. If required to match approved samples, provide pigmented filler.

E. Chemical Components: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
   1. Floor Sealers and Finish Coats: VOC content of not more than 350 g/L.

END OF SECTION 09 6466
SECTION 09 6513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Wall base.
   2. Molding accessories.

PART 2 - PRODUCTS

2.01 COLORS AND PATTERNS

A. Colors and Patterns: As indicated in finish schedule & color schedule on Drawings and verified with Architect.

2.02 RESILIENT WALL BASE

A. Wall Base: ASTM F 1861.
   1. Basis of Design: Johnsonite
   2. Roppe Corporation.

B. Type (Material Requirement): TP (rubber, thermoplastic).

C. Group (Manufacturing Method): I (solid, homogeneous).

D. Style: Cove (with top-set toe).

E. Minimum Thickness: 0.125 inch.

F. Height: 4 inches or 6 inches as indicated on Drawings and verified with Architect.

G. Lengths: Coils in manufacturer's standard length.

H. Inside and Outside Corners: Preformed.

I. Surface: Smooth.

2.03 RESILIENT MOLDING ACCESSORY

A. Description: Carpet edge for glue-down applications, reducer strip for resilient floor covering, joiner for (all types specified for this Project) tile and resilient floorings, joiner for tile and carpet, joiner for resilient floorings and carpet and joiner for any other transition not mentioned herein.
   1. Marley Flexco (USA), Inc.
   2. Roppe Corporation.
   3. Johnsonite- Roundel
5. Nora Rubber Flooring, Freudenberg Building Systems, Inc.

B. Material: Rubber.

C. Profile and Dimensions: As indicated, or if not indicated, as required to create smooth transitions between surfaces and meeting “Americans with Disabilities Act Accessibility Guidelines (ADAAG)” and applicable provisions of ICC/ANSI A117.1 as referenced by PA Uniform Construction Code.

2.04 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic cement based formulation provided or approved by resilient product manufacturers for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.
   1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
      a. Rubber Floor Tile Adhesives: Not more than 60 g/L.

END OF SECTION 09 6513
SECTION 09 6516 - LINOLEUM FLOORING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes linoleum sheet floor coverings.

PART 2 - PRODUCTS

2.01 LINOLEUM FLOOR COVERING

A. Basis of Design Products: Provide products by the following manufacturer:
   1. Armstrong Commercial Flooring.

B. Color: Colors as scheduled on Drawings.

C. Sheet Floor Covering: ASTM F 2034.
   1. Roll Size: In manufacturer's standard length by not less than 78 inches wide.

D. Seaming Method For Sheet Floor Covering: Heat welded.

E. Thickness: 0.10 inch.

F. Fire-Test-Response Characteristics:
   1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.

2.02 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic cement based formulation provided or approved by floor covering manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by floor covering manufacturer for products and substrate conditions indicated.

   1. Armstrong Weld Rod
   2. Colors: As scheduled.

D. Integral-Flash-Cove-Base Accessories:
   1. Cove Strip: 1-inch radius provided or approved by floor covering manufacturer.
   2. Cove-Base Cap Strip: Rubber cap provided or approved by floor covering manufacturer.
   3. Vinyl Flash Cap: Fillet strip and cove cap in one. In lieu of providing cove strip and base cap, provide Roppe #193 Vinyl Flash Cap.

E. Transition Strip: Rubber meeting requirements of Division 09 Section “Resilient Wall Base and Accessories.”
F. Metal Edge Strips: Of width shown and of required thickness to protect exposed edge of resilient flooring. Provide units of maximum available length, to minimize number of joints.

G. Extra Materials: Provide two cases of linoleum manufacturer’s recommended wax, one case of sealer, and two cases of multi-purpose cleaner, in one gallon containers with 6 per case.

END OF SECTION 09 6516
SECTION 09 6517 - SHEET SAFETY FLOORING (SSF)

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

PART 2 - PRODUCTS

2.01 SHEET FLOOR COVERING

A. Products: Sheet Floor Covering with Backing: ASTM F 1303
   1. Altro USA; Stronghold 30 Safety Flooring.
   2. Colors and Patterns: As scheduled.

B. Type (Binder Content): Type II, minimum binder content of 34 percent.

C. Backing Class: Class A (fibrous), non-woven, moisture resistant.

D. Overall Thickness: Min. 3 mm

E. Slip Resistance:
   ASTM D 2047 James Machine, SCoF Dry .92 / Wet 0.88 DIN 51130 Ramp Test - R 12

F. Static Load Limit:

G. Integrated bacteriostat

H. Sheet Width: 2 meters.

I. Wearing Surface: Smooth non-directional pattern, slip retardant particulate suspended evenly throughout the product thickness.


2.02 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
   1. Use for filling cracks, holes or leveling. White gypsum materials are not acceptable.
B. Substrate Vapor Emission Barrier: 2-part, one-coat liquid-applied, self-leveling moisture remediating and alkaline-control overlayment, or as otherwise recommended by flooring manufacturer.

C. Adhesives: Water-resistant type recommended by manufacturer to suit floor covering and substrate conditions indicated.
   1. Polyurethane Adhesive: For areas with drains or subjected to spillage or surface water, extreme temperature changes or heavy rolling loads, use Altrofix 30 or approved two-part resin-based polyurethane adhesive. For repairs and small areas, as recommended by Manufacturer and approved by Architect, use Altrofix 31.

D. Seamless-Installation Accessories:
      a. Color: Match floor covering.
   2. Gulley edge: Acceptable material, vinyl, sized to suit application
      a. For permanent waterproof mechanical attachment of flooring system to drain outlets and cleanouts.
   3. Joint cover strip: Acceptable material, vinyl, sized to suit application:
   4. Reducer strip - Reducer strip GE25RE/GE35RE where Altro safety flooring will not adjoin other materials or surfaces.
   5. Stainless Steel Deflector Plate: for use under heat-generating equipment.

E. Integral-Flash-Cove-Base Accessories: Provide the products indicated, or as otherwise approved by floor covering manufacturer and Architect. Provide inside and outside corner accessories as needed.
   1. Cove Strip: 1 1/4-inch radius. Provide reduced cove former at door jambs.
      a. Johnsonite CFS-00-A.
      b. Altro Cove Former CF38R
   2. Cove-Base Cap Strip.
      a. Johnsonite SCC-XX-D
      b. Altro Capping Seal C7
   3. Cove-Base Cap Transition to ceramic wall finish (subject to approval and compatibility with other products).
      a. Altro Captile Strip C4
   4. Corners: Stainless steel inside and outside corners and end stops supplied or approved by manufacturer.

F. Floor Polish: Provide protective liquid floor polish products as recommended by manufacturer.

END OF SECTION 09 6517
SECTION 09 6519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Vinyl composition floor tile (VCT)

B. Related Sections include the following:
   1. Division 09 Section "Resilient Base and Accessories" for wall base, reducer strips, and other accessories.

PART 2 - PRODUCTS

2.01 VINYL COMPOSITION FLOOR TILE

A. Basis-of-Design: Provide scheduled products by the following manufacturer:
   1. Armstrong World Industries, Inc.

B. Other Products and Manufacturers: Subject to compliance with requirements, and subject to prior approval.

C. Tile Standard: ASTM F 1066, Class 2, through-pattern tile with additional requirements as follows.
   1. Wearing Surface: Smooth.
   2. Thickness: 0.125-inch minimum.
   3. Size: 12 by 12 inches.
   4. Colors and Patterns: as scheduled.
   5. Average Weight: 1.37 lbs. per tile.

2.02 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Substrate Vapor Emission Barrier: 2-part, one-coat liquid-applied, self-leveling moisture remediating and alkaline-control overlayment, or as otherwise recommended by flooring manufacturer.

C. Adhesives: Water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.
   1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
      a. Vinyl Composition Floor Tile Adhesives: Not more than 50 g/L.
b. Rubber Floor Tile Adhesives: Not more than 60 g/L.

D. Floor Polish: Provide protective liquid floor polish products as recommended by manufacturer and coordinated with Owner's maintenance department.

END OF SECTION 09 6519
SECTION 09 6566 - RESILIENT ATHLETIC FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Rubber sheet athletic flooring (RRF).

PART 2 - PRODUCTS

2.1 RUBBER SHEET FLOORING

A. Description: Rubber athletic flooring provided as rolled goods for adhered installation.
   1. Basis of Design: Dropzone Speckle 8mm recycled non-laminated rubber sheet flooring by Tarkett Sports
   2. Subject to compliance with requirements and Architect’s approval, similar products by other acceptable manufacturers may be used if submitted in accordance with the Division 01. Test reports confirming compliance from an Independent Sports Laboratory must be provided along with samples, technical data, installation, maintenance, and warranty
      a. Amargo Products
      b. Everlast / Surface America / Ecore Commercial Flooring
      c. SportFloor/ US Rubber Recycling, Inc.
      d. Flexco/ Prime Sports
      e. Nora Systems, Inc.
      f. Regupol America
      g. Recoil Fitness/ Roppe Corporation, USA

B. Material: Recycled-rubber compound.
   1. Width Roll Width 4 ft
   2. Total Thickness 8 mm
   3. Weight 1.92 lbs/sq.ft.
   4. Tensile Strength ASTM D412 200 minimum
   5. Static Load ASTM F970 1000 p.s.i (modified test)
   6. Coefficient of Friction ASTM 2047 >.9
   7. Chemical Resistance ASTM F925 Excellent
   8. Ambient Noise Reduction ASTM C423 .10
   9. Impact Sound Insulation ASTM E492 .45 minimum
   10. Thermal Conductivity ASTM C518 Approximate .406
   11. Sound Transmission ASTM 413 .45 minimum

C. Traffic-Surface Texture: Smooth.

D. Roll Size: Not less than 48 inches wide by longest length that is practical to minimize splicing during installation.

E. Color and Pattern: As scheduled by Manufacturer's designations.
2.2 ACCESSORIES


B. Adhesives: Water-resistant type recommended in writing by manufacturer for substrate and conditions indicated.
   1. VOC Content: Not more than 60 g/L.

C. Sheet Underlay: Manufacturer recommended floating sheet, 1.3 mm thick PVC coated glass fibre with 0.30 mm thick studs..
   1. Tarkolay by Tarkett, or approved equivalent product.

END OF SECTION 09 6566
SECTION 09 6567 - RESILIENT ATHLETIC TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interlocking, rubber floor tile.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. FloorScore Certification: Resilient athletic flooring shall be certified under the RFCI FloorScore program.

B. Low-Emitting Materials: Flooring system elements shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 INTERLOCKING, RUBBER FLOOR TILE <Insert drawing designation>

A. <Double click here to find, evaluate, and insert list of manufacturers and products.>

B. Description: Athletic flooring consisting of modular rubber tiles with precision cut, interlocking edges, for free-lay installation.

C. Material: [Rubber] [Recycled-rubber compound].

D. Tile Interlock: [Visible] [Hidden].

E. Traffic-Surface Texture: [Smooth] [Nondirectional, stipple texture] [Textured] <Insert texture>.
   1. Provide reversible tiles (with traffic-surface texture on both sides).

F. Size: [Manufacturer's standard-size square tile] [24 inches square] <Insert dimension>.

G. Thickness: [3/8 inch] [7/16 inch] [1/2 inch] [9/16 inch] [3/4 inch] <Insert dimension>.

H. Weight: Not less than <Insert weight> per tile.

I. Color and Pattern: [As selected by Architect from manufacturer's full range] [As indicated by manufacturer's designations] <Insert color and pattern>. 
J. Border: Interlocking, beveled-edge tiles, of same material as floor tile; with bevels that transition from thickness of floor tile to surface below it; with straight outside edges; for use where flooring corners and edges do not abut vertical surfaces.

1. Border Color and Pattern: [Matching floor tile] [As selected by Architect from manufacturer's full range to contrast with floor tile] [As indicated by manufacturer's designations] <Insert color and pattern>.

2.3 ACCESSORIES


B. Adhesives: Water-resistant type recommended in writing by manufacturer for substrate and conditions indicated.

1. VOC Content: Not more than [50] [60] <Insert value> g/L.

END OF SECTION 09 6567
SECTION 09 6616 - TERRAZZO TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Resilient terrazzo floor tile and accessories.

PART 2 - PRODUCTS

2.1 ACCEPTABLE PRODUCTS

A. Resilient Terrazzo Floor Tile: Random distribution of one or more of marble, glass, or granite chips, embedded in flexible, thermoset-polyester-resin matrix; electrically nonconductive and chemical, oil, and corrosion resistive, with smooth wearing surface and manufacturer's standard factory-applied, protective urethane coating.
   1. Acceptable Manufacturer: Fritztile; www.fritztile.com
      a. Requests for substitutions will be considered only in accordance with provisions of Section 01 6000.
   2. Color/Pattern/Thickness: As indicated on drawings.
   3. Color Match: Obtain all tile materials from same production run.
   4. Obtain tile and installation materials and accessories from a single manufacturer.

B. Wall Base: Fritztile straight bull nosed wall base.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
   1. Flame Spread Index: 15, maximum, when tested in accordance with ASTM E 84.
   2. Smoke Density: Specific optical density, when tested in accordance with ASTM E 662, of 231.76 (smoldering) and 292.05 (flaming).
   3. Critical Radiant Flux: Minimum of 0.93 watt/cubic centimeter (Class 1) when tested in accordance with ASTM E 648.

B. Low-Emitting Materials:
   1. Flooring system, including installation materials, shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
   2. Flooring shall comply with indoor air quality emissions requirements of FloorScore certification.

C. Acoustical Testing:
   1. -ASTM E492-09/ASTM E989-06 (IIC) = 43dB
   2. -ASTM E90-09/ASTM E413-10 (STC) = 54 dB
D. Physical Performance Characteristics:
   1. Abrasion Resistance: Maximum 0.0196-cu. cm volume loss, ASTM F 510, Taber abrader, S-39 wheels, at 500 cycles with 1000-gram load.
   2. Compressive Strength: 2900 to 5000 psi, ASTM C 109 or ASTM D 695.
   3. Static Load Limit: 0.0007 inch maximum indentation, ASTM F 970 at 125 pounds
   4. Hardness: When tested in accordance with ASTM D 2240:
      b. Aggregate: Between Barcol 55 and 100.
   5. Squareness: 0.003 inch out of square, maximum, when measured in accordance with ASTM F 540.
   6. Coefficient of Friction: Greater than 0.7, average 0.74, when tested in accordance with ASTM D 2047.
   7. Chemical Resistance: No change or surface attack, color change, or swelling, when tested in accordance with ASTM F 925.
   8. Oil Resistance: Complying with MIL D-3134.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
   1. Provide Ardex leveling and patching compound products as recommended by Fritztile.

B. Adhesives: Water-resistant type recommended by manufacturers to suit floor tile and substrate conditions indicated, with VOC content of 65 g/L or less
   1. Fritz FA88 Powdered Multipurpose Adhesive
   2. Fritz FA1100 Pre-Mixed Wet Set Adhesive

C. Joint Sealant for Terrazzo Floor Tile: Silicone sealant of type and grade recommended in writing by floor tile manufacturer to suit resilient terrazzo floor tile.
   1. Sealant shall have a VOC content of 250 g/L or less.
   2. Joint-Sealant Color: As selected by Architect from manufacturer's full range to match floor tile.

D. Sealers and Finish Coats: Products recommended by floor tile manufacturer for resilient terrazzo floor tile.
   1. Provide two coats of Fritz FCP102 protective sealer and two coats of Fritz Duro-Gloss Finish FCP300, applied as recommended by manufacturer.

END OF SECTION 09 6616
PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Tufted Modular Tile Carpeting (CPT)
   2. Fusion Bonded Modular Entrance Floor Mat Tile Carpeting (EFM)

B. Related Sections include the following:
   1. Division 03 Section “Cast-In-Place Concrete” for concrete substrate and underlayment.
   2. Division 09 Section "Resilient Wall Base and Accessories" for resilient wall base and accessories installed with carpet.

PART 2 - PRODUCTS

2.01 CARPET

A. CPT: Subject to compliance with requirements, provide the following:
   1. Manufacturer: Milliken & Company, as scheduled on Drawings,
      a. Styles, colors and patterns as scheduled and indicated on the Drawings.
   2. Tile Size: Square and rectangular tiles, dimensions as scheduled.
   4. Static Control: 3.0 KV when tested under Standard Shuffle test (70 degrees, 20% RH)
   5. Indoor Air Quality: Comply with ASTM D 5116 and CRI Certified for low VOC emissions.
      a. Manufacturer must demonstrate that carpet is certified under the Carpet & Rug Institute’s Green Label Plus Program.
   6. Electrostatic Propensity: AATCC 134 – Less than 3.5 KV.
   7. Traffic Class: Heavy.
   8. Color Fastness:
      a. Colorfastness to Crocking: Not less than 4, wet and dry, per AATCC-165.
      b. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) per AATCC-16E.
   9. Lightfastness - AATCC 16E-1982 - Dark color: Gray scale rating of 4 or better after 160 standard fading hours as compared to AATCC Gray Scale for evaluation change in color.
   10. Ozone and Gas - AATCC 129-1981 - Rating 3 or better per color AATCC transference scale.

B. EFM: Subject to compliance with requirements, provide the following:
   1. Manufacturer: Mohawk Group, as scheduled on Drawings,
      a. Step in Style II tile; style, color and pattern as indicated on the Drawings.
   2. Tile Size: 24 inch x 24 inch.
   3. Indoor Air Quality: Comply with ASTM D 5116 and CRI Certified for low VOC emissions.
      a. Manufacturer must demonstrate that carpet is certified under the Carpet & Rug Institute’s Green Label Plus Program.
4. Electrostatic Propensity: AATCC 134 – Less than 3.5 KV.
5. Coefficient of Friction: 0.8

C. Match Manufacturer’s published data for scheduled products, as applicable, for the following material features and properties.
   1. Carpet Face Construction and Surface Texture
   2. Face Yarn/ Fiber Content
   3. Primary Backing
   4. Secondary Backing
   5. Density
   6. Dye Method
   7. Machine Gauge/ Stitches Per Inch
   8. Yarn Weight
   9. Pile Thickness

D. Pattern and Color: The architect reserves the right to reject any product or manufacturer based solely on pattern and color considerations.

2.02 INSTALLATION ACCESSORIES

A. Substrate Vapor Emission Barrier – At Contractor’s option, subject to Manufacturer’s determination of compatibility with scheduled finish and substrate, provide one of the following:
   1. Liquid-Applied System: 2-part, one-coat liquid-applied, self-leveling moisture remediating and alkaline-control overlayment, or as otherwise recommended by flooring manufacturer.
      a. For slabs showing RH less than 95 percent when tested per ASTM F 2170, provide VS-60 VersaShield Flooring Underlayment System.
      b. For slabs showing RH between 95 and 98.9 percent when tested per ASTM F 2170, provide VersaShield MBX Rolled Vapor Barrier System.
      c. Do not use VersaShield under linoleum, sheet rubber, or sheet vinyl safety flooring.

B. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided by or recommended by the carpet adhesive manufacturer.

C. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and that is furnished or recommended by carpeting manufacturer

D. Seaming Cement: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

E. Rubber/Vinyl Edge Strips: As specified in Division 09 Section “Resilient Wall Base and Accessories.”

F. Miscellaneous Materials: As recommended by manufacturer of carpet and accessory products, as required to complete installation.

END OF SECTION 09 6800
SECTION 09 7200 – WALL COVERINGS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Custom and Commercial Vinyl Wall Covering

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Standard and Custom Wall Covering Products: Provide scheduled products by scheduled manufacturer.
   1. Provide products by supplier capable of developing final graphic design, with sample proofs for verification, compliant with file formats, print resolution, color standards, and other manufacturer’s digital artwork standards.

2.02 WALL-COVERING PRODUCTS

A. General: Provide rolls of each type of wall covering from the same run number or dye lot.

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

C. Wall covering products as scheduled. Similar products meeting specified requirements by manufacturer approved subject to Section 01 6000 Product Requirements.
   2. Total Weight Excluding Coatings: min 20 oz/ lin. yd.
   3. Finished Width: 54 inches.
   4. Min 2oz/ sy woven or nonwoven fiber backing.
   5. Tear Strength: 25 x 25
   6. Tensile Strength: 50 x 55
   7. Low VOC: Print with water based inks.
   8. Stain-Resistant Coating: DuPont; Tedlar/Teflon, or manufacturer's standard, with prior approval.
D. Commercial Vinyl Wallcovering: Random Match / Reverse Hang; Type, pattern, color as scheduled.

E. Standard Digital Images: As approved by Architect. Coordinate with Manufacturer as scheduled.

F. Custom Digital Images: Coordinate parameters and format types for final print-ready digital artwork with approved manufacturer of wallcovering.
   1. Conceptual design will be developed by Architect.
   2. Coordinate final artwork, subject to Owner approval, with wallcovering supplier.
   3. Final sample of digital art is subject to Owner approval prior to ordering and shipping of wallcovering.

2.03 ACCESSORIES

A. Adhesive: Mildew-resistant, nonstaining, strippable adhesive, for use with specific wall covering and substrate application, as recommended in writing by wall-covering manufacturer, and with a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Primer/Sealer: Mildew-resistant primer/sealer as indicated and complying with requirements in Section 09912 Painting, and recommended in writing by wall-covering manufacturer for intended substrate.

END OF SECTION 09 7200
SECTION 09 7521 – MARBLE STOOLS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following: Marble stools.

B. Related Sections include the following:
   1. Division 07 Section "Joint Sealants" for sealing joints in stone with elastomeric sealants.

PART 2 - PRODUCTS

2.01 MARBLE STOOLS


B. Stone Fabrication: Fabricate in sizes and shapes required to comply with requirements indicated, including details on Drawings and Shop Drawings.

C. Comply with recommendations of Marble Institute of America's (MIA) "Dimensional Stone--Design Manual IV."

2.02 SETTING MATERIALS

A. Portland Cement: ASTM C 150, Type I or II. Provide natural color, white.

B. Hydrated Lime: ASTM C 207, Type S.

C. Aggregate: ASTM C 144 and as indicated below:
   1. For joints narrower than 1/4 inch, use aggregate graded with 100 percent passing No. 16 sieve.
   2. White-Mortar Aggregates: Natural, white sand or ground, white stone.

D. Molding Plaster: ASTM C 59.

E. Water: Potable.

F. Setting Shims: Resilient plastic shims, nonstaining to stone, sized to suit joint thicknesses.

G. Mortar and Grout Mixes: Comply with referenced standards and with manufacturers' written instructions. Do not use admixtures.

H. Spotting Plaster: Stiff mix of molding plaster and water.

I. Pigmented Pointing Mortar: Select and proportion pigments with other ingredients to produce color required. Do not exceed pigment-to-cement ratio of 1:10, by weight.

END OF SECTION 09 7521
SECTION 09 8400 – ACOUSTIC ROOM COMPONENTS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Lay-In acoustic ceiling diffuser panels.
   2. Fabric-wrapped sound absorptive/diffusive panels.
   3. Through Mounted cement and wood fiber board panels with bagged sound batt insulation.
   4. Auditorium Ceiling Reflectors
   5. Suspension hardware vibration isolators.
   6. Fiberglass partition isolation pad.
   7. Bagged sound batt insulation.
   8. 1 lb./s.f. mass-loaded vinyl.
   9. Metal acoustical wall panels

B. Related Sections:
   1. Division 09 Section “Gypsum Board Assemblies” for acoustical sealant.
   2. Division 09 Section “Acoustical Panel Ceilings” for lay-in suspension systems.
   3. Division 09 Section “Stretched-Fabric Wall Systems” for site-upholstered acoustical treatments.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Fabric-Wrapped Absorptive/Diffusive Panels and Lay-in Acoustic Ceiling Diffusers:

B. Illbruck, Minneapolis Sound absorptive panels:
   1. Basis for Design: Kinetics Noise Control, Dublin, OH; 614 889-0480
   2. RPG Diffusor Systems, Upper Marlboro, MD; 301 249-0044
   3. Wenger Corporation, Owatonna, MN; Ph: (800) 662-0032; 493-6437
   4. Wall Technology, Inc.

B. Cementitious Cement and Wood Fiber Through-mount Panels with acoustic insulation:

   1. Provide components for manufacturer’s designated C-40 mounting style, including wood furring and acoustical insulation.
2.02 FABRICATION

A. Fabricate acoustic panels to sizes, types, and configurations indicated.

B. Shop Assembly of Fabric-Wrapped Acoustic Panels: Panel cores and templates to be preassembled and wrapped with scrim (if necessary) and fabric in the shop prior to arrival at project site. No field assembly should be required.

C. Shop Assembly BAD Panels: Panel cores and templates will be preassembled and wrapped with scrim (if necessary) and fabric in the shop prior to arrival at project site. No field assembly is required.

D. Fabricate through-mounted panels with 1-inch face panel and 1-inch edge framing and integral fiberglass board acoustical insulation or provide 1-inch face panel over field applied furring strips and fiberglass board sound insulation.

E. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch for the following:
   1. Thickness.
   2. Edge straightness.
   3. Overall length and width.
   4. Squareness from corner to corner.

2.03 LAY-IN ACOUSTIC CEILING DIFFUSER PANELS

A. Barrel Ceiling Diffusor shall be thermoformed from a fire rated sheet of acrylic-polyvinyl chloride alloy or equivalent.
   1. Unit Shape and Dimensions: As scheduled. Flange width 3/8”. Depth variation and curvature per acoustic optimization as shown in shop drawings
      a. Barrel orientation: Provide panels with radius in both short and long directions.
   2. Weight: 3 pounds (maximum)
   3. Suspension: Units shall be compatible with 15/16” T-bar ceiling grids and are supported in a tegular mount.
   4. Fire rating: Class A materials per ASTM E-84.
   5. Units shall be supplied unfinished in standard white color. Fiber Panels

2.04 FABRIC-WRAPPED ABSORPTIVE/DIFFUSIVE PANELS

2.04 FABRIC-WRAPPED SOUND ABSORPTIVE PANELS:

A. Products and Manufacturers:
   2. BAD Colorsonix MBI Products.

B. Hardside Acoustical Panels:
   1. Thickness: as indicated on Drawings.
2. Size: As indicated on the drawings up to a maximum 48 inch x 120 inch panel.

3. Template: 1/8 inches thick high density fiberboard, density not less than 95 pounds per cubic foot.

4. Core: Semi-rigid Hardside Panel: fiberglass, density not less than 6 pounds per cubic foot and not more than 8 pounds per cubic foot, in scheduled thickness, 5 - 7 pcf density.

5. Edge Detail: Square hardened with non-resin, Class A hardening solution.

   a. Color: As noted in the Color Schedule.

7. Weight: 0.625 lbs per square foot (1-inch-thickness).

8. Sound Absorption (ASTM C423): Noise Reduction Coefficient as follows:
   a. 2 1/8 inch Panel: 1.05, minimum.
   b. 4 inch Panel: 1.09, minimum.

9. Mounting Accessories: Metal impaling Z-clips and self-adhesive hook & loop tape (Velcro or similar), Z-brackets.

C. Fabrication

2.05 LAY-IN ACOUSTIC CEILING DIFFUSER PANELS
(Scheduled on Drawings as “2x2 Ceiling Diffuser”)

A. 2-Dimensional Optimized Bicubic Ceiling Diffusor: Shape and orientation optimized to provide uniform diffusion, with optimized central area and four identical sides with the same displacement and zero gradient along their perimeter. Adjacent diffusors shall have identical joining sides regardless of their orientation.
      a. Thermoformed from a fire rated sheet of acrylic-polyvinyl chloride alloy or equivalent.

B. Weight: 3 pounds (maximum)
   1. Suspension: Units shall be compatible with 15/16” T-bar ceiling grids and are supported in a tegular mount.
   2. Fire rating: Class A materials per ASTM E-84.
   3. Units shall be supplied unfinished in standard white color.

2.062.05 THROUGH- MOUNTED CEMENT AND WOOD FIBER PANELS (TECTUM)

A. General Through-Mounted Acoustical Wall Panels: Manufacturer's standard panel construction consisting of cement and wood fibers with rigid glass-fiber board core with furred edges of same material as panel; and complying with the following requirements:
   1. Basis of Design Manufacturer: Tectum Inc.
2.1. Material: Aspen wood fibers bonded with inorganic hydraulic cement binder, formed in continuous process under heat and pressure.

3.2. Nominal Overall Panel Noise Reduction Coefficient: Not less than NRC 1.00.

4. Edge Detail: Square, long edge beveled.

5. Corner Detail: Square.

4.6. Finish: Manufacturer’s standard white painted finish ready for field applied painted graphics and colors.

B. Through-Mounted Acoustical Wall Panels:
   1. Width and Height: As shown on Drawings.
   2. Edge Detail: Square, long edge beveled.
   3. Corner Detail: Square.
   4. Sound Batt Insulation: 2 inches thick, 2.5 pcf density, mineral wool sound absorber.

C. Ceiling mounted Panels: (TE LAB D104, TE SHOP D107, WELDING D107a)
   1. Size: As shown on Drawings.
   2. Edge Detail: Square.
   3. Corner Detail: Square.

D-B. Bagged Sound Batt Insulation: 2 inches thick, 2.5 pcf density, mineral wool sound absorber encased in 2 mil thick black PVC embossed vinyl.
   1. Mounting Accessories: Offset mount Z-bracket (4 per panel) with recessed channels.
      a. Offset = 4 in clearance below metal roof deck

E-C. Fabricate panels to sizes and configurations indicated
   1. Fabricate panels in factory to exact sizes required to fit wall surfaces, based on field measurements of completed substrates indicated to receive wall panels.

E-D. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch for the following:
   1. Thickness.
   2. Edge straightness.
   3. Overall length and width.
   4. Squareness from corner to corner.

G-E. Sound-Absorption Performance: Provide wall panels with minimum noise reduction coefficients indicated, as determined by testing per ASTM C 423 for mounting type specified.

H-F. Mounting Accessories: Manufacturer's standard or recommended accessories for securely mounting panels, of type and size indicated, to substrates provided; and complying with the following requirements:

I-G. Through-Mounting Accessories: Furring strips, fiberglass board sound insulation, and hot dipped galvanized screws of kind required for substrate where panels are indicated (multi-purpose room). Provide painted TapCon screws for concrete masonry units, and screws and toggles bolts for gypsum wallboard.
2.07 AUDITORIUM ACOUSTIC PANEL REFLECTORS

A. Panels: Custom-fabricated suspended reflector assemblies.
   1. Gel Coat finish shall be Class C rated
   2. Field-adjustable reflection angles to allow acoustic tuning of space in field.
   3. Core: Gel coat finish panels, 1/2-inch, 5-ply plywood core with resin coat layer on back of panel.
   4. Face: 15 mil smooth finished gel coat with in matte finish.
      a. Color to be selected by Architect
   5. Suspension and Flexing system: Manufacturer’s standard attachment system, subject to compliance with requirements. In the event that variance from Basis of Design system causes modification to work of other Contracts, cost of such modification shall be the responsibility of General Contract.
      a. 1/8-inch steel angle painted black and 1/4-inch diameter zinc-plated tensioning rods mounted on the top (unexposed) side of the reflector panel.
      b. Through-bolt attachment of suspension/flexing angles with bolt heads color matched.
      c. Suspension: 1/8-inch diameter, commercial grade aircraft cable with cable thimble and double crimp sleeves.
   6. Safety Restraint: Secure each panel mounting assembly to structure above using cable or strap rated to withstand 1,000-lb free-fall load. Provide quick connector system designed to allow quick safe removal of dislodged panel.

B. Sound Reflectivity: Less than 0.05 Sabines of absorption per sq. ft. of panel for all 1/3-octave band frequencies in the 200 Hz to 2000 Hz range tested per ASTM C423 with a Type J mounting.

C. Weight of reflector panel: No less than 2 psf and a maximum of 2.5 psf Excludes steel framing weight.

D. Fabrication
   1. Fabricate face panels to the sizes shown on the Drawings as single units without visible joints or seams.
   2. Mounting System: Custom-fabricated in shop of structural metal and cabling, with all necessary accessories and appurtenances for a complete stable system.
   3. Defer only final touchup, cleaning, and polishing until after installation.

E. Acceptable Manufacturers: Subject to compliance with requirements and specific written approval by Architect, similar ceiling reflector panel systems may be available from the following manufacturers:
   2. RCB, Keith Bush Associates, Inc., 215.968.5255; keithbushassociates.com
   3. RPG Diffusor Systems Inc, Upper Marlboro, MD 301.249.0044; www.rpginc.com
2.08 SUSPENSION HARDWARE VIBRATION ISOLATORS

A. Metal Deck Suspended Ceiling Hanger: Designed and installed to resiliently suspend gypsum ceilings, where shown on drawings to be isolated from the building structure to reduce airborne sound and impact noise transmission.

B. Description: The isolation hanger shall be a combination high-deflection steel spring in series with a resilient, molded neoprene noise and vibration isolation pad. The steel spring and neoprene pad shall be incorporated into a stamped steel hanger assembly that resiliently supports the isolated ceiling.

C. All building components supported by the isolation hangers shall be free from rigid contact with any part of the non-isolated building structure to prevent unwanted sound flanking.

D. Resiliently suspended ceilings shall be separated where non-isolated building components abut. Isolation material shall be 3/8” thick Model SRP perimeter isolation board. Model SRP shall not be penetrated by nail, screw, or similar fastener. Model SRP shall be adhered to non-isolated structure. Resiliently suspended ceiling shall be constructed against Model SRP. Model SRP shall be sealed using resilient, non-hardening caulk.

E. Design and Performance: Submit design and product data showing compliance with performance requirements for each specific application.
   1. Resilient hangers shall have sufficient capacity to sustain continuously applied ceiling weight without settling after initial deflection.
   2. Design assembly bracket to allow 15 degrees of vertical alignment of the suspension member without making metal-to-metal contact between the suspension and hanger assembly members.
   3. Design hanger bracket with an integral spring pre-load bracket selected to minimize change in elevation once a load is applied to the hanger and to hold the isolator assembly steady during attachment of gypsum board.
   4. The hanger assembly bracket shall consist of a leveling rod with an attached channel carrier designed to accept 1-1/2” x 1/2”, 16-gauge cold-rolled steel.
   5. The isolation hanger deflection shall be selected by the manufacturer to provide a maximum natural frequency of 4.4 Hz. The steel spring element shall have a minimum Kx to Ky of 1 at its 1” rated deflection.

F. Test reports shall document a minimum STC 84 and IIC 70 for a resiliently suspended ceiling attached below a six-inch thick concrete slab and that consists of two layers of 5/8” thick gypsum board with 3-1/2” thick glass fiber batt in the cavity between the concrete slab and the top layer of gypsum board. Sound and impact test reports shall be from an independent laboratory.

2.09 1 LB./S.F. MASS-LOADED VINYL

A. Noise Barrier Material: 0.10” or thick, mass-loaded, limp vinyl sheet bonded to a thin layer of reinforced aluminum foil on one side.
   1. Basis of Design Product: Model KNM-100AL as manufactured by Kinetics Noise Control, Inc.
D. Performance requirements:
   1. Nominal density of 1.0 psf.
   2. Minimum flammability ratings when tested in accordance with Federal Test Std. No. 191-5903:
      a. 0.0 seconds from flame out and afterglow
      b. 0.2 inch for char length.
   3. Minimum thermal conductivity “K” value of 0.29
   4. Rated service temperature range of -40°F to 220°F

2.102.06 FIBERGLASS WALL ISOLATION PAD (PARTITION ISOLATION MAT)

A. General: Resilient pad designed and installed to resiliently decouple and isolate partition construction from the building structure.
   1. Product: WallMat Isolation Pad and KAI Isolation Bushing by Kinetics Noise Control.
   2. The sound isolation pad and bushing must meet the requirements for use in the Underwriters Lab (UL) fire rated assemblies HW-D-0031 (single stud) and/or HW-D-00447 (double stud) for sound control in dynamic head-of-wall joint systems.

B. Partition Isolation Pad. The isolation pad shall be made from precompressed fiberglass, formed to a 1/2” thickness and designed to carry continuous loads up to 25 psi without excessive creep or pad failure.
   1. Pad deflection shall be .175 inches at maximum rated load.
   2. Pad shall have sufficient compressive strength to sustain continuously applied partition weight without settling.

C. Anchor Isolation bushing: Minimum 1/2” inch total thickness, 60 durometer element that prevents any rigid contact of the anchor to the base and/or top plate of the steel studwall.
   1. Base channel shall be anchored to the floor/ceiling using Kinetics Model KAI rubber isolation step bushings spaced at 16” on center.

END OF SECTION 09 8400
SECTION 09 9100 - PAINTING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes surface preparation and field painting of exposed exterior and interior items and surfaces.
   1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.
   1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.

C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
   1. Prefinished items include the following factory-finished components:
      a. Architectural woodwork.
      b. Finished mechanical and electrical equipment.
      c. Light fixtures.
   2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
      a. Foundation spaces.
      b. Furred areas.
      c. Ceiling plenums.
      d. Pipe spaces.
      e. Duct shafts.
   3. Finished metal surfaces include the following:
      a. Anodized aluminum.
      b. Stainless steel.
      c. Chromium plate.
   4. Operating parts include moving parts of operating equipment and the following:
      a. Valve and damper operators.
      b. Linkages.
      c. Sprinkler heads
      d. Sensing devices.
      e. Motor and fan shafts.
   5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
D. Related Sections include the following:
1. Division 05 Sections for shop priming ferrous metal.
2. Division 08 Section "Steel Doors and Frames" for factory priming steel doors and frames.
3. Division 09 Section "Gypsum Board Assemblies" for surface preparation of gypsum board.
4. Division 32 Paving Sections for painted markings on concrete and asphalt paving

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.
   1. Products by other manufacturers will be acceptable only in compliance with the requirements for Product Substitutions and Comparable Products in Section 01 6000 “Products”

B. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
   1. Basis of Design: Sherwin-Williams Co. (S-W)
   2. Basis of Design, High Performance Coatings: Tnemec Company (T)
   3. PPG Industries, Inc., Pittsburgh Paints (PP)
   4. Benjamin Moore (BM)

2.02 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
   1. Flat Topcoat Paints: VOC content of not more than 50 g/L.
   2. Nonflat Topcoat Paints: VOC content of not more than 150 g/L.
   3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
   4. Floor Coatings: VOC not more than 100 g/L.
   5. Shellacs, Clear: VOC not more than 730 g/L.
   6. Shellacs, Pigmented: VOC not more than 550 g/L.
   7. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.

C. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
   1. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
D. Colors: As indicated by manufacturer's designations. If not indicated, as selected by Architect from manufacturer's full range.

2.03 CONCRETE UNIT MASONRY BLOCK FILLERS
B. Wet or humid areas: Factory-formulated high-performance waterborne cementitious acrylic block filler for waterbased epoxy topcoat.
C. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

2.04 EXTERIOR PRIMERS
A. Exterior Galvanized Metal Primer: Factory-formulated galvanized metal primer for exterior application.
D. See Division 05 Sections for factory-applied primer coats.

2.05 INTERIOR PRIMERS
A. Interior Concrete and Masonry Primer: Factory-formulated alkali-resistant acrylic-latex interior primer for interior application.
B. Interior Epoxy Primer:
1. Gypsum: Penetrating low-odor primer for sealing porous substrates, for interior application
2. Standard CMU applications: Factory-formulated acrylic-latex interior primer for interior application under epoxy paint
C. Interior Gypsum Board Primer: Factory-formulated latex-based primer for interior application.
D. Interior Wood Primer for Acrylic-Enamel and Semigloss Alkyd-Enamel Finishes: Factory-formulated alkyd- or acrylic-latex-based interior wood primer.
E. Interior Ferrous-Metal Primer (coordinate with Division 05 Sections for shop finish primer coats):
   1. Uncoated metal not exposed to view: Factory-formulated quick-drying rust-inhibitive, chemically active, modified alkyd-based metal primer, compatible with shop primers specified in Division 05 Sections and with specified finish.
   2. Uncoated metal exposed to view or as indicated on Drawings: Fast-curing polyamide epoxy primer, compatible with shop primers specified in Division 05 Sections and with specified finish.

F. Interior Zinc-Coated Metal Primer: Factory-formulated galvanized metal primer.

G. Interior Ferrous Metal Intermediate Coat: Polyamidoamine Epoxy intermediate coat for application over primer for exposed ferrous metal in Natatorium areas.

H. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds and repair painting galvanized steel, with dry film containing not less than 93 percent zinc dust by weight, and complying with DOD-P-21035A or SSPC-Paint 20.

2.06 EXTERIOR FINISH COATS

A. Exterior Semigloss Acrylic: Factory-formulated semigloss waterborne High-Performance Acrylic for exterior application.


2.07 INTERIOR FINISH COATS


B. Interior Semigloss Acrylic Enamel: Factory-formulated semigloss acrylic enamel for interior application.

C. Interior Waterborne Acrylic Epoxy: Factory-formulated satin or eggshell waterborne acrylic epoxy.


E. Interior Dry-Erase Coating: Factory-formulated waterbased, low-VOC clear coating for application over painted interior partition surface.

2.08 INTERIOR WOOD STAINS AND VARNISHES

A. Open-Grain Wood Filler: Factory-formulated paste wood filler applied at spreading rate recommended by manufacturer.
B. Interior Wood Stain: Factory-formulated alkyd-based penetrating wood stain for interior application applied at spreading rate recommended by manufacturer.

C. Clear Sanding Sealer: Factory-formulated fast-drying alkyd-based clear wood sealer applied at spreading rate recommended by manufacturer.

D. Interior Clear Satin Varnish: Factory-formulated alkyd- or waterborne polyurethane-based clear varnish.

END OF SECTION 09 9100
SECTION 09 9327 – DECORATIVE POLISHED CONCRETE FLOOR FINISH

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Polishing and densifying concrete floor slab
   2. Maintenance of finished floor for the duration of construction.

B. Related Sections:
   1. Division 03 Section “Cast-in-Place Concrete”
   2. Division 07 Section “Joint Fillers”

PART 2 - PRODUCTS

2.01 CONCRETE FINISHING PRODUCTS

A. Ensure manufacturer has minimum five years’ experience in manufacturing components similar to or exceeding requirements of project.

B. Acceptable Systems:
   2. Retro Plate, by Advanced Floor Products; www.retroplatesystem.com
   3. ARDEX Polished Concrete System (APCS), by Ardex Engineered Cements; www.ardexamericas.com

C. Basis-of-Design Products/Systems:
   1. Hardener, Sealer, Densifier: Water based, odorless liquid, VOC compliant, environmentally safe chemical hardening solution leaving no surface film.
      a. FGS Hardener Plus, RetroPlate, Ardex PC-10, or as otherwise accepted by Architect.
   2. Joint Filler: Semi-rigid, 2-component, self-leveling, 100% solids, rapid curing, polyurea control joint and crack filler with Shore A 80 or higher hardness.
      a. Joint Tite 750, Ardex Ardiseal, or as otherwise accepted by Architect.
   3. Oil Repellent Sealer: Ready to use, silane, siloxane and fluoropolymers blended water based solution sealer, quick drying, low-odor, oil and water repellent, VOC compliant and compatible with chemically hardened floors.
      a. Petrotex.
   4. Polish Guard (stain and wear protection treatment): Non-film forming, stain resistant, food resistant, chemical stain resistant, impregnating sealant designed to be used on concrete surfaces previously densified and polished.
a. Provide Manufacturer-recommended waterbased co-polymer microcoating, e.g.: Permaguard SPS, RetroGuard, Ardex PC Finish, Certi-Shine Finish Coat Ultra, or as otherwise accepted by Architect.

5. Cleaning Solution: Mild, highly concentrated liquid concrete cleaner and conditioner containing wetting and emulsifying agents; biodegradable, environmentally safe and certified High Traction by National Floor Safety Institute (NFSI).
   a. PermaGuard SPS, FGS Concrete Conditioner, Ardex PC Finish, or as otherwise accepted by Architect.

6. Finish: As indicated in “System Description” Article above.

D. Substitutions: In accordance with Division 01 Section “Product Requirements”

2.02 SOURCE QUALITY CONTROL

A. Ensure concrete finishing components and materials are from single manufacturer.

END OF SECTION 09 9325
SECTION 10 1100 - VISUAL DISPLAY SURFACES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Markerboards.
   2. Tackboards.
   3. Fabric Wrapped Tackboards.
   4. Support systems for visual display boards.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the manufacturers specified.
   1. Vertical Wall Solutions
   2. Claridge Products & Equipment, Inc.
   5. School Specialty Education Essentials
   1. Newline Products Inc
   2. American Visual Display Products, LLC
   3. ADP Lemco Inc.

B. Provide TB fabric according to schedule on Drawing. No substitutions will be accepted.

2.02 MATERIALS, GENERAL

A. Porcelain-Enamel Face Sheet: ASTM A 424, enameling-grade steel, uncoated thickness indicated; with exposed face and edges coated with primer, 1.5-mil-thick minimum ground coat, and color cover coat; and concealed face coated with primer and 1.5-mil-minimum thick ground coat.
   1. Matte-Finish Cover Coat: Low reflective; chalk wipes clean with dry cloth or standard eraser. Minimum 2.0-mil-thick cover coat. Cover and ground coats shall be fused to steel at manufacturer's standard firing temperatures.
   2. Gloss-Finish Cover Coat: Low gloss dry-erase markers wipe clean with dry cloth or standard eraser. Minimum 3.0-mil-thick cover coat. Cover and ground coats shall be fused to steel at manufacturer's standard firing temperatures.

B. Particleboard: ANSI A208.1, Grade 1-M-1.

C. Fiberboard: ANSI A208.2, Grade MD.

D. Cork Sheet: MS MIL-C-15116-C, Type II.

E. Plastic-Impregnated Cork Sheet: MS MIL-C-15116-C, Type I, seamless, homogeneous, self-sealing sheet consisting of granulated cork, linseed oil, resin binders, and dry pigments that are
mixed and calendared onto burlap backing; with washable vinyl finish and integral color throughout.

F. Fabric: As indicated on Architectural Drawings; with flame-spread index of 25 or less when tested according to ASTM E 84.

G. Extruded Aluminum: ASTM B 221, Alloy 6063.

2.03 MARKERBOARD ASSEMBLIES

A. Porcelain-Enamel Markerboard Assembly: Balanced, high-pressure, factory-laminated markerboard assembly of 3-ply construction consisting of backing sheet, core material, and minimum 0.020-inch-thick, porcelain-enamel face sheet with low-gloss finish.
   1. Particleboard Core: 3/8 inch thick; with 0.015-inch- thick, aluminum sheet or 0.0129-inch-thick, galvanized steel sheet backing.
   2. Laminating Adhesive: Manufacturer's standard moisture-resistant thermoplastic type.
   3. Fabricate with no horizontal seams in MB face sheet.

2.04 WALL-MOUNTED TACK ASSEMBLIES

   1. Provide Trim at Vinyl Faced Tackboard Assemblies as indicated on Architectural Drawings.


2.05 MARKERBOARD AND TACKBOARD ACCESSORIES

A. Aluminum Frames and Trim: Fabricated from not less than 0.062-inch-thick, extruded aluminum; of size and shape indicated.
   1. Field-Applied Trim: Manufacturer's standard snap-on trim with no visible screws or exposed joints

B. Marker-tray: Manufacturer's standard, continuous.
   1. Solid Type: Extruded aluminum with ribbed section and smoothly curved exposed ends.

C. Map Rail: Provide the following accessories:
   1. Display Rail: Continuous and integral with map rail; fabricated from cork approximately 2-inch-wide.
   2. End Stops: Located at each end of map rail.
   3. Map Hooks and Clips: Four map hooks with flexible metal clips for each room.
   4. Flag Holder: One for each room.

D. Visual Display Rail: Manufacturer's standard, tackable visual display surface fabricated into 2-inch-high rail shaped and designed for displaying material.
E. Special-Purpose Graphics: Fuse or paint the following graphics into surface of porcelain-enamel visual display unit:
   1. Music staff lines where indicated.

F. Wood Trim: As indicated on Architectural Drawings and specified elsewhere.

G. Magnetic Marker Tray: Manufacturer’s standard, as indicated on Architectural Drawings.

2.06 FABRICATION

A. Porcelain-Enamel Visual Display Assemblies: Laminate porcelain-enamel face sheet and backing sheet to core material under heat and pressure with manufacturer's standard flexible, waterproof adhesive.

B. Visual Display Boards: Factory assemble visual display boards, unless otherwise indicated.

C. Factory-Assembled Visual Display Units: Coordinate factory-assembled units with trim and accessories indicated. Join parts with a neat, precision fit.
   1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, balanced around center of board, as acceptable to Architect.
   2. Provide vertical seam ‘H’ bars between abutting markerboards.
   3. Provide manufacturer's standard mullion trim at joints between markerboards and tackboards of combination units.
   4. Where size of visual display boards or other conditions require support in addition to normal trim, provide structural supports or modify trim as indicated or as selected by Architect from manufacturer's standard structural support accessories to suit conditions indicated.

D. Aluminum Frames and Trim: Fabricate units straight and of single lengths, keeping joints to a minimum. Miter corners to neat, hairline closure. Provide frames and trim for markerboards and tackboards.

2.07 ALUMINUM FINISHES

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

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

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

D. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.

END OF SECTION 10 1100
SECTION 10 1400 - SIGNAGE

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Panel signs.
   2. Signage accessories.

B. Related Sections include the following:
   1. Division 01 Section "Temporary Facilities and Controls" for temporary project identification signs.

PART 2 - PRODUCTS

2.01 PANEL SIGNS

A. General: Provide panel signs that comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction. Confirm method required for each sign type.
   1. Produce smooth panel sign surfaces constructed to remain flat under installed conditions within tolerance of plus or minus 1/16 inch measured diagonally.
   2. Raised Copy (Inset, Cutout Characters) – Typical: Sign face routed to receive push-through acrylic graphics slightly projecting from the sign panel.
      a. At Contractors Option: Raised Copy Signage may consist of non-inset cutout characters that are chemically welded to the sign face.
   3. Flush Copy (Etched and Filled Graphics): Sign face etched or routed to receive enamel-paint infill.
   5. Changeable Message Inserts: Fabricate signs to allow insertion of changeable messages in the form of transparent covers with paper inserts printed by Owner.

B. Cast-Acrylic Sheet: Manufacturer's standard and as follows:
   1. Colors: As noted in drawings, or custom color as selected by Architect if not noted.

C. Unframed Panel Signs: Fabricate signs with edges mechanically and smoothly finished to comply with the following requirements:
   1. Edge Condition: Square cut.
   2. Corner Condition: Rounded to 1/2-inch-radius.

D. Laminated Panels: Permanently laminate face panels to backing sheets of material; use manufacturer's standard process.
E. Graphic Content and Style: Provide sign copy that complies with requirements indicated on Drawings for size, style, spacing, content, mounting height and location, material, finishes, and colors of signage.

F. Changeable Message Inserts: Fabricate signs to allow insertion of changeable messages in the form of transparent covers with paper inserts printed by Owner.

G. Tactile and Braille Copy: Manufacturer's standard process for producing raised copy complying with ADA Accessibility Guidelines and ICC/ANSI A117.1. Text shall be accompanied by Grade 2 braille. Produce precisely formed characters with square cut edges free from burrs and cut marks.
   2. Raised-Copy Thickness: Not less than 1/32 inch.
   3. Finish raised characters to contrast with background color, and finish Braille to match background color


I. Colored Coatings for Acrylic Sheet: For copy and background colors, provide Pantone Matching System (PMS) colored coatings, including inks and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are nonfading for application intended.

2.02 PANEL SIGN TYPES

A. Panel Signs, General:
   1. Material: Cast-acrylic sheet, except as otherwise indicated.
   2. Perimeter: Unframed.
   3. Copy: Tactile and braille. Raised copy (text and graphics) except as otherwise indicated
   5. Message: Fixed, fixed with changeable message inserts, and changeable message inserts.
   6. Sizes: As scheduled or as indicated on Drawings.
      a. Character: Minimum 3/4-inch-high characters, except as otherwise indicated.
   7. Backer-Plate: For signs mounted on glass, provide backer-plate in same size and color as sign.

B. Room Signs:
   1. Text: Per the most current Contractor’s Sign Schedule, as approved by the Owner.
   3. Sizes:
      a. Sign: 8-inches square.
   4. Colors: Custom color matching sample provided by the Architect.

C. Exterior Panel Signs:
   1. Text: Per the most current Contractor’s Sign Schedule, as approved by the Owner.
   3. Sizes:
      a. Sign: 1’-2” high x 8”-inches.
   4. Colors: Custom color matching sample provided by the Architect.
D. Toilet Room Signs:
   1. Graphic: Male, female or handicap symbol.
   2. Text: According to requirements in ICC/ANSI A117.1 or of authorities having jurisdiction, whichever are more stringent.
   4. Sizes:
      a. Sign: As indicated on the Drawings.
   5. Colors: Custom color matching sample provided by the Architect.

2.03 ACCESSORIES

A. Mounting Methods: For exposed fasteners provide flat head tamperproof screws in color to match sign and silicone adhesive fabricated from materials that are not corrosive to sign material and mounting surface.

B. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.
   1. Use concealed fasteners and anchors unless indicated to be exposed.
   2. For exterior exposure, furnish nonferrous-metal devices unless otherwise indicated.
   3. Exposed Metal-Fastener Components, General:
      a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.
      b. Fastener Heads: For nonstructural connections, use oval countersunk screws and bolts with tamper-resistant Allen-head or one-way-head slots unless otherwise indicated.

4. Sign Mounting Fasteners, as recommended by manufacturer for specific application:
   a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.
   b. Projecting Studs: Threaded studs with sleeve spacer, welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.

C. Adhesives: As recommended by sign manufacturer and with a VOC content of 70 g/L or less for adhesives used inside the weatherproofing system and applied on-site when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch (1.14 mm) thick, with adhesive on both sides.

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

2.04 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
B. Protect mechanical finishes on exposed surfaces from damage by applying strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.

END OF SECTION 10 1400
SECTION 10 2113 – TOILET COMPARTMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes SCRC (Solid-Color Reinforced Composite) units as follows:
1. Toilet Enclosures: Overhead braced and floor anchored.
2. Urinal Screens: Wall attached and post supported.
3. Hardware and accessories

B. Related Sections include the following:
1. Division 06 Section "Miscellaneous Rough Carpentry" for blocking and overhead support of anchored post units.
2. Division 10 "Toilet Accessories" for toilet tissue dispensers, grab bars, purse shelves, and similar accessories.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: 1090 Series/ Sierra Series by Bobrick Washroom Equipment, Inc.
1. The listing of specific Bobrick products is to establish a standard for design, function, materials, workmanship, and appearance. Contractor may submit other manufacturers for evaluation and acceptance subject to compliance with Basis-of-Design requirements and substitution requirements.

B. Toilet partitions and accessories shall be the products of a single manufacturer.

2.02 SOLID RESIN UNITS

A. Design:
1. Toilet-Enclosure Style: Overhead braced.
2. Urinal-Screen Style: Post supported.

B. Door, Panel and Pilaster material: Solid, SCRC panel material composed of dyes, organic fibrous material, and polycarbonate/phenolic resins, seamless, with eased edges, and with homogenous color and pattern throughout thickness of material.
1. Material shall have a non-ghosting, graffiti resistant surface integrally bonded to core through a series of manufacturing steps requiring thermal and mechanical pressure.
2. Color: as scheduled
   a. Edges of material shall be the same color as the surface.
3. Finish Thickness
   b. Panels and benches - 1/2 inch.
4. Provide finish panels with the following surface-burning characteristics when tested according to ASTM E 84.
   a. Flame Spread: 25 or less.
   b. Smoke Developed: 450 or less.

5. Subject to compliance with the material performance requirements, toilet partition systems manufactured using the solid surface materials indicated below may be proposed.
   a. Solid phenolic partition systems by the following:
      1) Accurate Partitions
   b. Solid Surface products and partition systems: Homogeneous filled polyester, acrylic-modified, cast-polymer through-color panels complying with ANSI/ICPA-SS-1
      1) Privacy Plus Toilet Compartments by Gerali Custom Design, Inc.
      2) Ultimate Corian System by Shower Shapes
      3) Gibraltar or EarthStone material by WilsonArt International

6. Toilet partitions constructed of High Density Polyethylene (HDPE) or High Density Polypropylene will not be acceptable.

C. Pilaster Shoes and Sleeves (Caps): Manufacturer's standard design; ASTM A 666 stainless steel 302/304, not less than 0.03 in thickness, 3-in high, finished to match hardware, fastened using #14 stainless steel tamper-resistant screws.

D. Brackets (Fittings): Full-Height (Continuous) Type: Manufacturer's standard design;

E. Support Posts for Urinal Screens: Manufacturer's standard 304 stainless steel post with floor shoe matching that on the pilaster and head anchoring to ceiling construction or to overhead brace.

F. Anchor pilasters to floor with heavy gauge Stainless Steel angles allowing full adjustment of pilaster.

G. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum strip fastened to exposed bottom edges of solid-polymer components to prevent burning.

2.03 ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories; manufacturer's standard satin finish 304 stainless steel.

B. Overhead Bracing: Manufacturer's standard continuous, 304 stainless steel head rail with antigrip profile and in manufacturer's satin finish.

C. Hinges: Heavy-duty stainless steel with gravity-acting cams and wraparound flanges. Hinges allow for simple adjusting at the job site to a full close or partially open position, as required.

D. Support Posts for Urinal Screens: Manufacturer's standard 304 stainless steel post with adjustable floor shoe for anchoring to floor and ceiling construction or to overhead brace.

E. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match hardware, with theft-resistant-type heads. For through-bolt applications provide sex-type bolts. For concealed anchors, provide stainless or rust-resistant, protective-coated steel.
2.04 FABRICATION

A. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, fasteners, and anchors at pilasters to suit floor conditions.
   1. Make provisions for setting and securing continuous head rail at top of each pilaster. Provide shoes at pilasters to conceal supports and leveling mechanism.

B. Doors: Unless otherwise indicated, provide 24-inch-wide in-swinging doors for standard toilet compartments and 36-inch-wide out-swinging doors with a minimum 32-inch-wide clear opening for compartments indicated to be accessible to people with disabilities.
   1. Hinges: Manufacturer's standard barrel-type self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.
   2. Latch and Keeper: Recessed latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be accessible to people with disabilities.
   3. Coat Hook: Combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
   4. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
   5. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with accessibility requirements of authorities having jurisdiction. Provide units on both sides of doors at compartments indicated to be accessible to people with disabilities.

C. Urinal-Screen Posts: Provide corrosion-resistant anchoring assemblies with leveling adjustment at bottoms of posts. Provide shoes at posts to conceal anchorage.

END OF SECTION 10 2113
SECTION 10 2600 - IMPACT-RESISTANT WALL PROTECTION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following: Corner guards, matching existing plastic corner guards installed as part of addition and alteration project of 2008.

B. Related Sections include the following:
   1. Section 09 3000 Tiling for extruded aluminum satin nickel corner and edge trim (CG-1) installed as part of ceramic wall assembly.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide products matching the style, type, appearance, quality, performance, and accessories of existing installed products as manufactured by Basis for Design manufacturer. Products by other manufacturers are subject to approval per Division 01 Section “Material and Equipment.”
   1. Basis for Design: Construction Specialties, Inc.

2.02 MATERIALS

A. Extruded Rigid Plastic: Textured, chemical- and stain-resistant, high-impact-resistant, PVC or acrylic-modified vinyl plastic; thickness as indicated with integral color throughout.
   1. Minimum impact resistance of 25.4 ft-lbf/in. of notch when tested according to ASTM D 256, Test Method A.
   2. Chemical and Stain Resistance: Tested according to ASTM D 543.
   3. Self-extinguishing when tested according to ASTM D 635.
   4. Color and Texture: As indicated by referencing manufacturer's designations, as scheduled on Drawings.

B. Aluminum Extrusions: Provide alloy and temper recommended by the manufacturer for the type of use and finish indicated, but with not less than the strength and durability properties specified in ASTM B 221 for alloy 6063-T5.

C. Stainless-Steel Sheet: ASTM A 240.

D. Fasteners: Provide aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with aluminum components, hardware, anchors, and other items being fastened. Use theftproof fasteners where exposed to view.

E. Adhesive: Type recommended by the manufacturer for use with material on the substrate indicated.
   1. VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.03 CORNER GUARDS
A. Surface-mounted, resilient plastic corner-guard assembly consisting of a snap-on-type plastic cover installed over a continuous aluminum retainer, including mounting hardware; fabricated with 90-degree turn to match wall condition; height as indicated.
   1. Cover: Extruded, rigid plastic, minimum 0.078 inch thick, in dimensions and profiles indicated.
   2. Retainer: Continuous, one-piece, extruded-aluminum retainer; minimum 0.062 inch thick.
   3. Accessories: Provide prefabricated, injection-molded top cap and aluminum base with concealed splices, cushions, mounting hardware, and other accessories as required.
      a. Top and bottom caps shall match color of plastic covers and shall be field adjustable for close alignment with snap-on plastic covers.

2.04 FABRICATION
A. General: Fabricate impact-resistant corner protection systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including thicknesses of components.
B. Preassemble components in the shop to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.
C. Fabricate components with tight seams and joints with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.
D. Brackets, Flanges, Fittings, and Anchors: Provide wall retainers, miscellaneous fittings, and anchors for interconnecting members to other construction.
E. Provide inserts and other anchoring devices for connecting components to partition. Fabricate anchoring devices to withstand imposed loads. Coordinate anchoring devices with the supporting structure.

END OF SECTION 10 2600
SECTION 10 2813 - TOILET ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following: Public-use washroom accessories.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Bobrick Washroom Equipment, Inc. unless noted otherwise on the Accessory Schedule
   1. Provide products scheduled on Drawings.
      a. There are items scheduled to be provided by the Owner and installed by the GC.
         These products are indicated on the schedule for information purposes.
   B. Subject to compliance with requirements, accessories may be provided by one of the following manufacturers upon approval by Architect.
      1. A & J Washroom Accessories, Inc.
      2. American Specialties, Inc.
      5. McKinney/Parker Washroom Accessories Corp.

2.02 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, with No. 4 finish (satin), in 0.0312-inch minimum nominal thickness, unless otherwise indicated.
B. Galvanized Steel Sheet: ASTM A 653/A 653M, G60.
C. 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.
D. Mirror Steel: Type 430 stainless steel with bright polished finish; 1/4-inch return concealing 1/4-inch tempered masonite backing.
F. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.
2.03 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: Provide concealed anchorage where possible.

C. Recessed Toilet Accessories: 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 non-absorptive 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. One-piece, galvanized steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
   2. Heavy-duty wall brackets of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
   3. Frameless stainless Steel Mirror furnished with mounting screws and finishing washers.

F. Keys: If not supplied by Owner, provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - Grab Bar: Where indicated, provide stainless-steel grab bar complying with the following:

END OF SECTION 10 2813
SECTION 10 4400 - FIRE-PROTECTION SPECIALTIES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Portable fire extinguishers
   2. Fire-protection cabinets for portable fire extinguishers

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following:
   2. Fire-End & Croker Corporation.
   3. J.L. Industries, Inc.
   4. Medtronic, Inc.
   5. Potter-Roemer; Div. of Smith Industries, Inc.
   6. Watrous; Div. of American Specialties, Inc.

2.02 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008, Commercial Steel (CS), Type B.

B. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated
   1. Extruded Shapes: ASTM B 221.

C. Acrylic Bubble: One piece.

2.03 PORTABLE FIRE EXTINGUISHERS

A. General: Provide fire extinguishers of type, size, and capacity for each fire-protection cabinet and mounting bracket and only mounting bracket at other locations as indicated.
   1. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.

B. Multipurpose Dry-Chemical Type in Steel Container (General Use): UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.
   1. Basis-of-Design: Larsen’s MP or DC series.
   2. Locate in FEC

C. Wet-Chemical Type (Kitchen): UL-rated 2-A:1-B:C:K, 1.6-gal. nominal capacity, with aqueous solutions of potassium acetate, potassium citrate, potassium carbonate or combinations of these agents in stainless-steel container; with pressure-indicating gage.
2. Direct mount to wall.

2.04 FIRE-PROTECTION CABINETS

A. Cabinet Type:
   1. Suitable for approved portable extinguisher.
   2. Where indicated, suitable for approved portable extinguisher and blanket, with blanket shelf located 9" down from the top of the cabinet.

B. Cabinet Construction: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Weld joints and grind smooth. Miter and weld perimeter door frames.
   1. Fire-Rated Cabinets: Listed and labeled to meet requirements of ASTM E 814 for fire-resistance rating of wall where it is installed.
      a. Construct fire-rated cabinets with double walls fabricated from 0.0478-inch-thick, cold-rolled steel sheet lined with minimum 5/8-inch-thick, fire-barrier material.
      b. Provide factory-drilled mounting holes.
   2. Cabinet Metal: Clear Anodized Aluminum.
   3. Door Material: Manufacturer's standard clear anodized aluminum.
   4. Door Style: one-piece molded acrylic full bubble with frame, clear color.
      a. Fire Blanket Style: Solid opaque panel with frame.

C. Cabinet Mounting: Suitable for recessed and semi-recessed mounting conditions with cabinet box fully recessed in walls of sufficient depth to suit style of trim indicated.

D. Door Construction: Fabricate doors according to manufacturer's standards, of materials indicated, and coordinated with cabinet types and trim styles selected.
   1. Provide minimum 1/2-inch-thick door frames, fabricated with tubular stiles and rails, and hollow-metal design.

E. Door Hardware: Provide manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated. Provide either lever handle with cam-action latch, keyed lock or exposed or concealed door pull and friction latch. Provide concealed or continuous-type hinge permitting door to open 180 degrees.
   1. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.

F. Cabinet Trim Style: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.
   1. Exposed Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
      a. Flat Trim: 1/4 to 5/16-inch backbend depth.
   2. Cabinet Trim Material: Manufacturer's standard clear anodized aluminum.
2.05 ACCESSORIES

A. Mounting Brackets: Manufacturer's standard steel, designed to secure extinguisher to wall or structure, of sizes required for types and capacities of extinguishers indicated, with plated or baked-enamel finish.

B. Extinguisher Theft Alarm: Manufacturer's standard battery operated alarm, 10 second delay for disarming, activated by opening cabinet door.

C. Extinguisher Brackets: Formed steel, chrome-plated.

2.06 FINISHES, GENERAL

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

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

C. Cabinet and Door Finishes: Provide manufacturer's standard baked-enamel paint for exterior and interior of cabinets and doors.
   1. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust, and other contaminants that could impair paint bond using manufacturer's standard methods.
   2. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.
      a. Fire Extinguisher Colors: Door - red; cabinet color - white.
      b. AED Colors: Door and cabinet – white with red lettering.

END OF SECTION 10 4400
SECTION 10 5113 - METAL LOCKERS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
1. Metal Staff KD lockers.
2. Selective modifications and adjustments to existing corridor lockers.

B. Related Sections include the following:
1. Division 06 Section "Miscellaneous Rough Carpentry" for furring, blocking, and shims required for installing lockers and concealed within other construction before metal locker installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements and approval by the Architect, available products from the following manufacturers may be incorporated into the Work:
1. Basis of Design: List Industries Inc.
2. Art Metal Products.
3. DeBourgh Manufacturing
4. Lightning Lockers, LLC
5. Lyon Workspace Products.
6. Newline Products Inc

2.02 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008, Commercial Steel (CS) Type B, suitable for exposed applications.

B. Fasteners: Zinc- or nickel-plated steel, slotless-type exposed bolt heads, and self-locking nuts or lock washers for nuts on moving parts.

C. Anchors: Select material, type, size, and finish required for secure anchorage to each substrate.
1. Provide hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance.
2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.03 STAFF LOCKERS

A. Provide Knocked-Down, Quiet Metal Lockers:
1. BASIS OF DESIGN: List; Standard Quiet KD lockers.
2. As determined by Owner, provide basis-of-design product or similar products by one of the accepted manufacturers, subject to compliance with requirements and Architect's approval.
B. Locker Arrangement:
   1. Size 12-in W x 12-in D x 72-in H
   2. Configuration: SINGLE TIER with integral welded base
   3. Tops: Individual flat top.

C. Material: Cold-rolled steel sheet.

D. Body: Assembled by riveting or bolting body components together. Fabricate from unperforated, cold-rolled steel sheet with thicknesses as follows:
   1. Tops and Intermediate Dividers: 0.024 inch-thick (24 gage) with single bend at sides.
   2. Bottoms and Tier Dividers: 0.060-inch-thick (16 gage) with single bend at sides.
   3. Backs and Sides: 0.024 inch thick (24 gage) with full-height, double-flanged connections.
   4. Shelves: 0.060-inch-thick (16 gage) with double bend at front and single bend at sides and back.

E. ‘Quiet’ Type Doors: One-piece; fabricated from 0.060-inch-thick (16 gage), cold-rolled steel sheet; formed into channel shape with double bend at vertical edges, and with right-angle single bend at horizontal edges.
   1. Stiffeners: Manufacturer's standard full-height stiffener fabricated from min. 0.04-inch-thick, cold-rolled steel sheet; welded to inner face of doors.
      a. Stiffener required where locker door exceeds 15 inches in width.
      b. Acceptable option: Provide 0.074-in (14 ga) doors in lieu of welded stiffeners where door exceeds 15 inches wide.
   2. Louvered Vents: No fewer than six louver openings at top and bottom of door face.

F. Hinges: Welded and riveted, factory-installed rivets that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees.
   1. Continuous Hinges: Manufacturer's standard, steel continuous hinge.

G. Recessed Door Handle and Latch: Seamless stainless-steel cup with integral door pull, smooth, rounded edges inside, recessed so locking device does not protrude beyond face of door; pry resistant.
   1. Multipoint Latching: Finger-lift latch control designed for use with padlocks; positive automatic and prelocking.
      a. Latch Hooks: Equip doors 48 inches and higher with 3 latch hooks; fabricated from minimum 0.0966-inch-thick steel; welded or riveted to full-height door strikes; with resilient silencer on each latch hook.
      b. Latching Mechanism: Manufacturer's standard rattle-free latching mechanism and moving components isolated with vinyl or nylon to prevent metal-to-metal contact, and incorporating a prelocking device that allows locker door to be locked while door is open and then closed without unlocking or damaging lock or latching mechanism.

H. Legs: 6 inches high; formed by extending vertical frame members, or fabricated from 0.075-inch nominal-thickness steel sheet; welded to bottom of locker with closed front and end bases.
2.04 LOCKER EQUIPMENT, ACCESSORIES, FINISH

A. Equip each metal locker with identification plate, shelf, one double-prong ceiling hook, and two single-prong wall hooks.

B. Inside Corner Angle, Filler Panels and Slip Joint/ Angle fillers: Fabricated from cold-rolled steel sheet, manufacturer's standard thickness, but not less than 0.032 inch thick (21 ga).

C. Recess Trim: Top and Sides, nom. 3-inch wide, fabricated from 0.048-inch (18 ga) nominal-thickness steel sheet.

D. End Panels and Filler Panels: Fabricated from 0.060-inch-thick (16 ga), cold-rolled steel sheet.

E. False Front: Typical door and frame assembly with door made inoperable, for use at columns, duct spaces and other obstructed area.

F. Finish: Manufacturer’s standard baked enamel or powder coat.
   1. Color, New Staff Lockers: As scheduled on Architectural Drawings.
   2. Color, Modification of Existing Corridor Lockers: Match color of existing corridor lockers, as acceptable to Owner and Architect. Provide custom match if necessary.

2.05 FABRICATION

A. General: Fabricate metal lockers square, rigid, and without warp; with metal faces flat and free of dents or distortion. Make exposed metal edges free of sharp edges and burrs, and safe to touch.
   1. Form body panels, doors, shelves, and accessories from one-piece steel sheet, unless otherwise indicated.
   2. Provide fasteners, filler plates, supports, clips, and closures as required for a complete installation.

B. Unit Principle: Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments.

C. Knocked-Down Construction: Fabricate metal lockers for nominal assembly at Project site using nuts, bolts, screws, or rivets. Factory weld frame members together to form a rigid, one-piece assembly.

D. Accessible Lockers: Fabricate as follows:
   1. Locate bottom shelf no lower than 15 inches above the floor.
   2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches above the floor.

E. Hooks: Manufacturer's standard ball-pointed type, aluminum or steel; zinc plated.

F. Identification Plates: Manufacturer's standard etched, embossed, or stamped aluminum plates; with numbers and letters at least 5/8 inch high.

G. Continuous Sloping Tops: Fabricated in lengths as long as practicable, without visible fasteners at splice locations; finished to match lockers.
1. Sloped top corner fillers, vertical for recessed and mitered for exposed lockers.

H. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip joint filler angle formed to receive filler panel.

I. End Panels
   1. Finished End Panels: Designed for concealing unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.
   2. Boxed End Panels: Fabricated with 1-inch-wide edge dimension, and designed for concealing fasteners and holes at exposed ends of nonrecessed metal lockers; finished to match lockers.
   3. Extend panel tight to wall, or provide closure trim to wall.

2.06 STEEL SHEET FINISHES

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

B. Factory finish steel surfaces and accessories except stainless-steel and chrome-plated surfaces.

C. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust, and other contaminants that could impair paint bond. Use manufacturer's standard methods.

D. Baked-Enamel Finish: Immediately after cleaning, pretreating, and phosphatizing, apply manufacturer's standard thermosetting baked-enamel finish. Comply with paint manufacturer's written instructions for application, baking, and minimum dry film thickness.

E. Powder-Coat Finish: Immediately after cleaning and pretreating, electrostatically apply manufacturer's standard baked-polymer thermosetting powder finish. Comply with resin manufacturer's written instructions for application, baking, and minimum dry film thickness.

2.07 STAINLESS-STEEL FINISHES

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

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
   1. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

END OF SECTION 10 5113
SECTION 77 5613 - METAL STORAGE SHELVING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Post-and-cantilever adjustable metal storage shelving
   1. Wall mounted style

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to
   product selection:
   1. Basis-of-Design Product: The design for each type of metal storage shelving is based on the
      product named. Subject to compliance with requirements, provide either the named product
      or a comparable product.

2.02 MATERIALS

A. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale,
   pitting, or surface defects; pickled and oiled.

B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with G60
   zinc (galvanized) or A60 zinc-iron-alloy (galvannealed) coating.

D. Steel Tubing: ASTM A 513, Type 2.

E. Steel Wire: ASTM A 899.

2.03 POST-AND-SHELF METAL STORAGE SHELVING

A. Open Post-and-Cantilever Metal Storage Shelving: Factory-formed, field-assembled, post-and-
   shelf metal storage shelving system; designed for shelves to span between and be supported by
   posts, with shelves adjustable over the entire height of shelving unit post. Fabricate initial shelving
   unit with a post at each back corner. Fabricate additional shelving units as add-on units, designed
   to share center posts for back to back shelving units, or mount to wall as indicated. Provide fixed
   bottom shelves, and adjustable top and intermediate shelves, and accessories indicated.
   1. Basis-of-Design: E-Z Shelving Systems, Inc. 800 353-1331 or comparable product, in
      shelving style indicated on Drawings.
   a. Wall-Mounted: Upright with slotted tubular face to receive shelf brackets and double
      flange on backside for attachment to substrate.
2. Posts: Fabricated from 14 gage (0.0677-inch-) thick, cold-rolled steel; manufacturer's standard tubular open box; with perforations at 1-1/2 inches o.c. to receive shelf-to-post connectors.
   a. Add-On Shelf Posts: 14 gage (0.0677-inch-) thick, cold-rolled steel, match main posts.

3. Shelf Brackets: 12 gage (0.093-inch) thick, galvanized steel sheet, with holes for secure attachment to posts, include hot dipped galvanized bolts, clamps and lock nuts.

4. Solid Shelves: Fabricated from 16 gage (0.053-inch) thick, galvanized steel sheet, with slots or holes for secure attachment of shelf.
   a. Fabricate fronts and backs of shelves with box-formed edges, with corners lapped and welded.
   b. Load-Carrying Capacity: 500 lbs.

5. Shelf Quantity: As shown on the drawings.

6. Shelf-to-Post Connectors: Mechanical fasteners (6 gauge steel clamps with profile matching posts secured with fastening bolts). Provide clamps and hardware plated with electro-zinc and chromate dipped to enhance rust prevention.

7. Anti-sway braces: 1 inch by 6 gage steel straps to cross-brace freestanding shelving and satisfy specified performance requirements.

8. Ceiling Bracket: Similar to shelf bracket; 12 gage (0.093-inch) thick, galvanized steel sheet, pre-punched to accept sheet metal screws for anchoring directly to ceiling.


10. Overall Unit Sizes: As indicated on the Drawings for each different location required.

11. Finish: Manufacturer's standard baked enamel or plastic powder resin coating.

B. Closet Rods: 1-1/16 inches outside diameter chrome plated round tubing of 14 gauge steel thickness.

C. Rod Hanger: 14 gauge electro-zinc plated and chromate dipped steel notched and formed to hold closet rod under front vertical flange of shelf.

2.04 FABRICATION

A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Fabricate freestanding metal storage shelving square and rigid with posts plumb and true, and shelves flat and free of dents or distortion. Fabricate connections to form a rigid structure, free of buckling and warping.

C. Shear and punch metals cleanly and accurately. Remove burrs.

D. Form edges and corners free of sharp edges or rough areas. Fold back and crimp exposed edges of unsupported sheet metal to form a 1/2-inch-wide hem on the concealed side; ease edges of metal plate to radius of approximately 1/32 inch.
E. Form metal in maximum lengths to minimize joints. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

F. Weld corners and seams continuously to comply with referenced AWS standard and the following:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   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.
   5. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

G. Build in straps, plates, brackets, and other reinforcements as needed to support shelf loading.

H. Cut, reinforce, drill, and tap metal fabrications to receive hardware, fasteners, and similar items.

I. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

J. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous.

2.05 FINISHES, GENERAL

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

B. Finish all steel surfaces, components, and accessories except prefinished stainless-steel and chrome-plated surfaces.

C. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry thickness.

2.06 GALVANIZED STEEL FINISHES

A. Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.

B. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard 2-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil for topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.
1. Color and Gloss: As selected by Architect from manufacturer's full range.

END OF SECTION 10 5613
SECTION 11 1319 - LOADING DOCK EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
1. Dock bumpers.

PART 2 - PRODUCTS

2.01 DOCK BUMPERS

A. Manufacturer: Approved Dock Leveler Manufacturer.

B. Steel-Face, Laminated-Tread Bumpers: Fabricated from multiple, uniformly thick plies cut from fabric-reinforced rubber tires and with 3/8-inch steel face plate of same size as rubber surface. Laminate plies under pressure on not less than two 3/4-inch diameter, steel supporting rods that are welded at one end to 1/4-inch-thick, structural-steel end angle and secured with a nut and angle at the other end. Fabricate angles with predrilled anchor holes and sized to provide not less than 1 inch of tread plies extending beyond the face of closure angles. Weld face plate to two steel support brackets, which shall extend back to and engage 3/4-inch- diameter support rods in elongated holes, allowing steel face to float on impact.

C. Anchorage Devices: Hot-dip galvanized steel anchor bolts, nuts, washers, bolts, sleeves, cast-in-place plates, and other anchorage devices as required to fasten bumpers securely in place and to suit installation type indicated.

2.02 FINISHES, GENERAL

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

B. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
1. ASTM A 123 for iron and steel loading dock equipment.
2. ASTM A 153 for iron and steel hardware for loading dock equipment.

END OF SECTION 11 1319
SECTION 11 3112 - APPLIANCES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes free-standing and mounted appliances and appurtenances, as indicated in Appliance Equipment Schedule on Drawings.

B. Related Sections include the following:
   1. Division 12 Section "Manufactured Wood Casework" for cabinets and countertops that receive residential appliances.
   2. Division 21 through 26 Sections for services and connections to appliances.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis-of-Design Product: Provide the scheduled product. Substitute products by other manufacturers subject to the requirements of Division 01 Section “Product Requirements.”

2.02 FINISHES, GENERAL

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

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

C. Color-Coated Finish: Provide appliances with manufacturer's standard finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, color, gloss, and minimum dry film thickness for painted finishes.

END OF SECTION 11 3112
SECTION 11 4000 – FOOD SERVICE EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The requirements of the contract documents apply to all work under this heading and are hereby made a part of this section. DO NOT BID OR PERFORM WORK WITHOUT READING AND UNDERSTANDING THESE REQUIREMENTS.

1.02 SCOPE OF WORK

A. General: Provide and install all food service equipment with related items necessary to complete the work shown on the drawings and required by the provisions of this section.

1. The term "install" shall mean the delivery of all food service equipment complete with transportation charges prepaid to the building, uncrated, set-in-place and properly anchored, where required.

2. Deliver all parts that are to be built into cast-in-place concrete or masonry in ample time for inclusion in the concrete or masonry work. Furnish all necessary setting plans and instructions, oversee the installation of all parts in the masonry or concrete and be responsible for the correctness and accuracy of location and installation.

3. Cut holes and ferrules on equipment for pipes, drains, electric outlets, conduits and similar items, as required, coordinating the installation of the food service equipment with the work of other contractors.

4. Keep premises clean and remove from site all crates, cartons and other debris resulting from work. Leave all areas "broom clean" throughout construction and final clean prior to turning over to Owner. Final sanitizing of equipment by Owner.

1.03 MECHANICAL AND ELECTRICAL WORK INCLUDED IN FOOD SERVICE EQUIPMENT WORK

A. Plumbing:

1. Interplumb food service equipment between valves, vacuum breakers and equipment connections, and make ready for final connection by Plumbing Contractor. All exposed plumbing shall be silver painted, except where noted.

2. Furnish and install all chrome-plated faucets and hose reels specified for sinks, kettles and other equipment. Furnish all backsplash-mounted faucets with double male nipples having locknuts for rigidly securing faucets to backsplash.

3. Furnish and install all wastes incorporated in the custom-fabricated food service equipment, complete with silver-painted tailpiece.

4. Extend all indirect wastes not connected to the sewage system with silver-painted tubing. Drain extensions shall drip over and into floor drain. Where drain runs under an item of equipment, provide proper support from bottom of equipment to eliminate interference with the floor cleaning.
5. Provide gas-pressure regulators on the individual pieces of gas-fired equipment per manufacturer's recommendation.

B. Electrical:
1. Interwire food service equipment between heating elements, switches, starters, thermostats, outlets, motors and solenoids complete to junction box, terminal box or disconnect switch.
2. Furnish and install all switches including disconnect switches within equipment, contactors, combination starters with fused disconnect, controls and similar items necessary for the safe and proper operation of the equipment.
3. Furnish all electrically-operated portable or movable equipment with three-wire or four-wire, heavy-duty rubber cord fitted with grounded plug with one (1) leg of the cord grounded to frame of equipment.
4. Furnish and install grounded receptacles specified under Item Specifications and/or shown as part of the item of equipment, including stainless-steel faceplate.
5. Furnish and install electric thermostats, where required; Robertshaw or approved equal, unless otherwise specified.

C. Refrigeration:
1. Furnish, install and thoroughly test refrigeration systems furnished as part of the food service equipment. (See Paragraph "Warranty and Service" for general specifications covering refrigeration systems and service contracts for same.)

D. Heating and Ventilation:
1. Furnish and install #18-gauge stainless-steel vent ducts from vent collars in top of dishwasher to six (6") inches above finished ceiling. Provide dampers, where required.

E. Steam Fitting:
1. Furnish and install special pressure regulators, steam trap assemblies, control valves, pressure gauges, strainers and other devices required for the proper operations of steam operated equipment. Interconnect devices and make ready for final connection.
2. Furnish and install steam thermostats, where required, on steam-heated or steam-operated equipment, Fulton, Powers or approved equal.
3. Furnish and install pressure regulators for all items of steam-operated equipment, where required.

1.04 RELATED WORK SPECIFIED ELSEWHERE (Not in This Section)

A. Floor depressions indicated on the drawings and where required.
B. Finished floor and sub-floor requirements for Walk-In Refrigerator and Freezer.
C. Required holes and recesses for piping and ducts provided with information as to location and size is furnished to other trades in adequate time to be incorporated in the work.
D. Roughing-in wiring for the food service equipment and final connection between roughing-in points and points of connection (pigtails or terminals) on the food service equipment; connections to the equipment shall be in accordance with equipment wiring diagrams.

E. Wall receptacles shown and required for the food service equipment.

F. Required disconnect switches between roughing-in points and points of connection to the equipment.

G. Providing and installing traps, strainers and valves, including items furnished by the Food Service Equipment Contractor and making final connections to the food service equipment.

H. Final connections between the vent collars in top of the ventilators over the cooking and baking equipment and the building ventilation system.

I. Final connections between the vent ducts off of dishwasher, these ducts being extended six (6") inches above the finished ceiling by the Food Service Equipment Contractor.

J. Roughing-in, furnishing and installing all hot and cold water piping between roughing-in points and points of connection on the equipment, providing in each water line a shut-off valve and, where required, a pressure reducer and regulator and making final connection to the food service equipment.

K. Installation of the final connection to faucets furnished by the Food Service Equipment Contractor on sinks, tables, kettles, and other equipment.

L. Waste piping (excluding indirect waste piping), traps and vents, and final connections to drain outlets of sinks, disposers and other equipment.

PART 2 – PRODUCTS

2.01 STANDARD MANUFACTURED OR "BUY-OUT" EQUIPMENT

A. Standard food service equipment made on a production basis is named by catalog number in the Item Specifications and establishes the "standard" required. Items identified by a manufacturer's model number shall be supplied with all parts and accessories listed by that manufacturer as standard and included in the base price. Optional accessory items will be specifically stated in the Item Specifications.

2.02 NAMEPLATES

A. Each item of manufactured or "buy-out" equipment furnished under this Contract shall be provided with identifying nameplate of corrosion-resistant material giving name and address of manufacturer, catalog and serial numbers, and other identifying information for use in securing replacement parts.

B. Nameplate shall fit snugly against the surface of the item, shall be free of rough edges and shall be attached in such manner as not to interfere with the cleaning of the equipment.
2.03 MOTORS

A. All electric motors and operating controls shall be splash-proof and conform to the available electrical characteristics on the premises. All fractional horsepower motors under 1/2-horsepower shall be supplied to operate on 120 volt, 60 cycle, single-phase current. All 1/2-horsepower and over shall be supplied to operate on the power circuit, three-phase current, or as otherwise specified.

2.04 HEATING EQUIPMENT

A. All electrical heating units shall be provided with an "On/Off" switch, ruby light indicator, U.L. Approved wiring, grounded and prewired by this Contractor to a connection box, ready for final connection by other trades.

2.05 WARRANTY AND SERVICE

A. Provide a listing of factory-authorized service agencies and copies of written service and warranty agreements on all food service equipment items. Provide written warranty agreeing to replace free of charge any work, equipment, parts, materials and/or workmanship that become defective during the warranty period (except that which becomes defective due to abuse of the equipment). Replacement shall be made without cost to the Owner and the Food Service Equipment Contractor shall reimburse the other contractors for extra work involved in the replacement of defective equipment. Warranty period is for one (1) year from date equipment is put into continuous operation and accepted by Owner.

B. All refrigeration systems shall be furnished with a one (1) year prepaid service contract and a five (5) year warranty on the compressor. Warranty to begin at time when equipment is put into continuous operation and accepted by Owner.

C. Service contracts on refrigeration systems must be contracted for by the Food Service Equipment Contractor with authorized local service organizations capable of providing prompt and efficient service on the equipment. Submit copies of all service contracts to the Architect upon completion of the installation of the food service equipment.

2.06 SUBSTITUTIONS – STANDARDS

A. The name or make of any article, device, material or form of construction listed in the Item Specifications shall establish the "Standard" required.

B. Proposals shall be based on the manufacturers and models specified; however, if bidders desire to submit prices of other manufacturers, they may do so by submitting the request ten (10) days prior to the due date for review and possible pre-approval.

C. Any alternate equipment obtaining pre-approval must conform to space limitations of the layout and the cost of any deviation will be the responsibility of the Food Service Equipment Contractor at no extra cost to the Owner or other Contractors.

D. Accepted alternates will be noted in the Contract and no other substitutions will be permitted subsequent to the signing of the Contract, except by specific change order.
2.07 CUSTOM-FABRICATED EQUIPMENT

A. Custom-fabricated equipment shall be constructed in strict accordance with the Contract Drawings and be the best grade manufacture of one of the following pre-approved food service equipment custom-fabricators: Bova Corporation, P.O. Box 118, 111 McFann Road, Valencia, PA 16059; Keystone Custom Fabricators, Inc., 108 Atlantic Avenue, Elizabeth, PA 15037; and Commercial Stainless, Inc., 900 Patterson Drive, Bloomsburg, PA 17815. This discipline shall have been in continuous business for a minimum of five (5) years and successfully completed projects of similar size and scope.

B. Products must conform to the requirements of the plans and specifications established as the "Standard" required.

2.08 MATERIALS - METAL

A. All materials shall be new, of prime quality, full gauge thickness of composition indicated by name or abbreviations used in Item Specifications.

B. All gauges herein specified shall be standard U.S. gauges. Unless specified, no material shall be furnished lighter than #18-gauge.

C. Whenever galvanized iron and/or galvanized sheets are specified, or required, it shall be an approved grade of copper-bearing steel as manufactured by Armco, or equal. Wherever galvanized angles or channels are specified, these shall be of copper-bearing steel as specified for sheets. All fabricated edges of sheets or angles shall be protected by a special metalizing process to give all fabricated edges and surfaces equal protection to the finished surfaces.

D. Where stainless steel is specified, sheets, castings or tubing shall be Type 304 of the 18-8 Series with a content of from 17% to 19% chrome, 7% to 10% nickel and a maximum carbon content of .09. All exposed stainless-steel surfaces shall be a No. 4 mill finish. An exposed surface shall be interpreted to include inside surfaces exposed to view when any door is opened.

E. All unexposed portions shall be ground smooth with either a #80 grit finish or a first cut commercial finish.

F. Tubing shall be #16-gauge stainless steel, (.065) thick, seamless drawn or shall have seam welded continuously, ground smooth and polished.

G. Color of equipment of any nature: As selected by the Architect from manufacturer's standard and designer series color charts.

2.09 GENERAL DETAIL FOR THE CONSTRUCTION OF CUSTOM-FABRICATED EQUIPMENT

A. Joints and Welds:
1. All equipment herein specified, when constructed of more than one (1) piece and/or sheet of metal shall be continuously butt-welded, ground and polished smooth. Field joints shall be as few as possible. All welded parts shall be homogeneous, non-porous, free-from-pits, cracks, imperfections or discolorations. All welding shall be electric process with all joints...
ground and polished smooth. The welding rods used shall be of the same composition as sheets of parts welded.

B. Tops:
1. All table tops, counters and like items, unless otherwise specified, shall be of #14-gauge stainless steel, No. 4 finish, of one (1) sheet without seams, with edges as indicated on detail drawings.
2. Tops shall be stud-bolted to counter frames on 2'-6" centers and to channel bracing of "open" fixtures. Provide chrome-plated acorn cap nuts.
3. Field joints in tops shall be welded, ground smooth and polished only where tops exceed length of available sheets and/or where building accesses do not permit the top to be brought into the building in one (1) piece.

C. Channels:
1. All channels shall be of #14-gauge stainless-steel construction, 1" x 4" x 1", edges ground and polished. Channel shall be attached to table tops, counters and like items in "legs down" position. Full perimeter shall be sealed to table top with clear silicone mastic sealant, Component Hardware M90-1010. Channels shall run front-to-back at each leg location with additional channel bracing running between front-to-back channels, down the center of the fixture. Where channels intersect, they shall be fully welded, ground, and polished. Where an item of food service equipment is to be placed on a work table or counter, provide additional channel bracing to accommodate the weight and operation of the equipment items.

D. Sound Deadening:
1. Apply 3M Company, #Y434 W/L, two (2") inches wide, aluminum foil tape to the underside of all table and counter tops, spaced on eight (8") inch centers.

E. Sinks:
1. All sinks shall be constructed of #14-gauge stainless steel, No. 4 finish, with all corners formed with a three-quarter (3/4") inch radius, both horizontal and vertical. All sink sizes established on the Detail Drawings to be inside measurements.
2. Partitions between sink compartments shall be double-walled with three-quarter (3/4") inch radius corners three-quarter (3/4") inch radius top edges welded-in-place, ground smooth and polished. Fronts, bottoms and back of multiple compartment sinks shall be one (1) piece with no overlapping joints or open crevices. Bottom of each compartment shall be creased to center and fitted with lever-operated waste with strainer plate and a brass tailpiece for slip connection. Lever waste to be set into one-half (1/2") inch deep recess assuring complete draining. Overflow shall be fitted in back of sink so the constant water level is one (1") inch below sink rim and/or adjoining drainboard level and shall be factory-installed.
3. Where sinks occur in tables, they shall be entirely welded to the table top with all welds ground smooth and polished with no trace of welding left, all to give the appearance of one (1) continuous piece.
4. Sinks are to have a stainless-steel backsplash, where required, of the height specified.
5. Provide two (2) holes for specified faucets. Where adjacent equipment has a similar backsplash, the backsplash shall be matching in height and design and tops joined with a top cap.
F. Drainboards and Dish Tables:
1. All drainboards shall be constructed of #14-gauge stainless steel. Turn front and ends up three (3") inches and finish with one-and-one-half (1-1/2") inch, 180-degree roll. All corners, both horizontal and vertical, shall have standard three-quarter (3/4") inch radius. Exterior corners shall be rounded. Weld drainboards to sink forming an integral unit.

G. Pitch and Drainage:
1. Wherever a fixture is used with a waste or drain outlet, the surface shall have a distinct pitch toward such an outlet. Dish tables and drainboards shall have a definite pitch to drain. Pitch to be accomplished on table top only.
2. Where drains are called for to be located in long tables or where drainage is necessary, such table tops shall be provided with drains located at specific points as shown on the drawings.

H. Faucets and Wastes:
1. All plumbing fixtures shall be ANSI/NSF61 Section 9 Certified, CSA Certified, and EPA Act 2005 Compliant. Faucets shall be provided with stainless-steel seats and two-part stem assemblies, lever handles, and chrome-plated ADA easy-turn stems.
2. Furnish all faucets lever-handle, quick-opening wastes with overflow assemblies, basket wastes, straight wastes and valves normally supplied with equipment for proper operation of a particular item. Sink mixing faucets are to be Chicago models as follows, or T & S B200 Series with Monel seat.
3. Wall-type swing faucet with integral stops, Chicago 540-LD-L9-R-748-2K, or Fisher 3250 Series, combination sink fitting, less soap dish, complete with integral stop supply arms, and with nine (9") inch swing spout attached to backsplash with one-half (1/2") inch close nipple and one-half (1/2") inch copper to flange sink ell.
4. Deck-type swing faucet less integral stops, Chicago 540-LD-L9-EA-748-2K or Fisher 3310 Series, combination sink fitting, less soap dish, with one-half (1/2") inch flanged female inlet shank with integral stop, one-half (1/2") inch, I P male brass supply with locknut, galvanized washer, coupling nut on inlet and nine-inch (9") swing spout.
5. Chrome-plated, lever-handle, two (2") inch, I.P.S. quick-opening waste with rear outlet connection for chrome-plated brass overflow fitting with one-and-one-quarter (1-1/4") inch brass tubing to be complete assembly as manufactured by Fisher 24902 Series or Component Hardware Model D50-7215 or D10-4591.

I. Enclosed Cabinets:
1. Construct all enclosed bases, cabinets and wall cabinets and the like of #18-gauge stainless steel, No. 4 finish, single-wall, pan-type, completely one (1) piece welded construction with no visible joints or screw attachments showing. Entire unit to be rigidly braced with #14-gauge stainless-steel angles or channels, where required, and/or angle iron frames. All vertical corners shall be standard square break radius.

J. In Lieu of Enclosed Cabinet Construction Outlined Above, Angle Frame Construction May be Used:
1. Angle iron frames shall be 1-1/2" x 1-1/2" x 1/8" cross braced on 2-6" centers full length of items. At point of gusset attachment, provide #12-gauge stainless-steel triangular plate, properly welded to bottom of frame. All joints shall be welded ground smooth to make a
perfect joint and then sprayed with three (3) coats of enamel. Side, front, and rear panels shall be #20-gauge stainless steel.

K. Doors:
1. Doors shall be double pan construction, #18-gauge face, #20-gauge rear stainless steel, unless otherwise specified. Doors to be five-eighth (5/8”) inch thick and filled with sound-deadening material. Provide each door with a door handle.

L. Counter Legs:
1. Component Hardware A52-9907, six (6”) inch high, adjustable, stainless-steel legs.

M. Wheels and Casters:
1. Portable equipment shall be mounted on casters of the size specified or as provided as “Standard” by the manufacturer, but must comply with the Load Rating Standards of the Casters & Floor Truck Manufacturers' Association and with the NSF Sanitary Requirements. Casters, forks and guards are to be cadmium-plated. Wheels are to be disc-steel type with neoprene tires. Provide wheel locks where specified.

2. Casters shall be equal in quality to:
   - Jarvis & Jarvis swivel plate Model 5-25-111, with or without brakes.
   - Jarvis & Jarvis rigid plate Model 5-26-111.
   - Jarvis & Jarvis stem caster Model 5-27-111, with or without brakes.
   - Jarvis & Jarvis sealed caster - NSF Listed.
   - Jarvis & Jarvis Model 5-50-113 GBL, wheel and rotation brakes, five (5”) inch diameter, ball bearing, swivel.
   - Bassick swivel Model 5NS6GW-2BCHR - plate.
   - Bassick swivel Model 5NS6GW-2BX67CHR - pipe leg.
   - Bassick rigid Model 5NT6GW-2BCHR - plate.

N. Undershelves - Open Construction:
1. Solid removable undershelves shall be fabricated of #16-gauge stainless steel, No. 4 finish, with all edges formed to fit cross rails with rolled drop edges one-and-one-half (1-1/2”) inches deep. All corners and intersections ground and polished smooth. Cut out corners of shelves to fit snug around all leg locations. Provide a one-and-one-half-inch (1-1/2”), 90-degree turn-down at shelf joint, where cross rails do not occur. Turn rear edges of undershelves up one-and-one-half (1-1/2”) inches with coved radius. Maximum length of sections shall be 2'-6”.

2. Solid fixed undershelves shall be fabricated of #16-gauge stainless steel with all free edges turned down one-and-one-half (1-1/2”) inches.

3. Notch and weld at legs. Where edges are specified to be turned up, turn up on a three-quarter (3/4”) inch radius to the height specified.

4. Weld a #14-gauge stainless-steel channel centered full length of underside of fixed undershelves.

O. Undershelves - Cabinet Style:
1. All cabinet shelving shall have pan-type, removable bottom and intermediate shelves and shall be #18-gauge stainless steel, No. 4 finish, unless otherwise specifically stated, with all shelf joints welded. Turn shelves up three (3”) inches at rear and ends with one (1”) inch radius cove corner where shelves turn up at the rear. The turned up edges must be tight-fitting against cabinet framing and enclosure. If cabinet enclosure has sliding doors, the lower shelf shall be
provided with stainless-steel guide pins. The intermediate shelving shall be fixed, unless specifically stated otherwise.

**P. Overshelves:**
1. Overshelves shall be fabricated of #16-gauge stainless steel, No. 4 finish, with edges rolled down or up, as specified, having same construction as "Tops."
2. Mount shelving on #16-gauge stainless-steel tubing of the diameter specified.
3. Overshelves at walls are to be cantilever-mounted, with the upright passing down through the backsplash rim, and bolted to extended channels for support.
4. When overshelves are to be mounted to a flat top, secure with concealed fasteners.

**Q. Wall Shelves:**
1. Wall shelves shall be fabricated of #16-gauge stainless steel, No. 4 finish, with edges rolled up or down, as specified, having same construction as "Tops." Provide with two (2") inch turned up rear and end risers. Mount to wall on #14-gauge stainless steel cantilever brackets. Secure brackets to wall with stainless-steel screws with lead expansion shields. Brackets shall be spaced a maximum of 4'-0" on center.

**R. Legs:**
1. All legs shall be one-and-five-eighth (1-5/8") inch outer-diameter x #16-gauge stainless-steel tubing. Legs shall be located as shown on the plan and/or sections and shall not exceed 6'-0" on center. All joints between legs and undershelves or cross rails shall be welded, ground smooth and polished. Each leg shall be fitted with Component Hardware Model A10-0852, round bottom collar and foot insert, Type #18-8 stainless steel, sized for one-and-five-eighth (1-5/8") inch, #16-gauge tubing.

**S. Leg Sockets (Gussets):**
1. Leg sockets shall be cylindrical, one (1) piece, stainless-steel construction. Leg sockets shall be welded to supporting members, spot welded with sealant around remaining perimeter. Leg sockets shall fit snug at legs or uprights and legs or uprights shall be secured by an Allen set screw. Leg sockets shall be Component Hardware A20-0206, Type #18-8 stainless steel.

**T. Cross Rails:**
1. Cross rails shall be one-and-one-quarter (1-1/4") inch outer-diameter x #16-gauge stainless-steel tubing mounted ten (10") inches above the floor, ground and polished. Cross rails shall be attached to every leg and shall be run front-to-back and full length between legs at rear and front. When fixed undershelves are specified, cross rails may be omitted.

**U. Drawers: (See Details on Drawing)**
1. The drawer pan shall be #20-gauge stainless steel. All vertical and horizontal corners shall have three-quarter (3/4") inch minimum coved radius. Top of pan to flange out and be removable without the use of tools.
2. The drawer slides shall be the full-suspension, self-closing type and fitted with four (4), case-hardened, ball-bearing rollers. Track attached to drawer upper edge shaped to fit contour of roller rim to provide a position drawer guide and prevent jarring, outer track fastened to the drawer housing and provided with limit stops. Assembly shall be Component Hardware S52-002.
3. The drawer housing shall be #18-gauge stainless steel to enclosed front, sides and back of drawer assembly to extend from underside of table or counter top, down to bottom of drawer front. Front of housing fitted with opening (with edges turned in one-half (1/2") inch and
corners welded to accommodate drawer body and slides. Top turn-in provided with holes for receiving threaded studs welded to underside of table or counter top for bolting housing thereto.

4. All drawers shall be 20" x 20" x 5" deep, unless otherwise specified. All drawers shall be fitted with Kason Model 0382 drawer pulls.

END OF SECTION 11 4000
SECTION 11 5011 – MISCELLANEOUS EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes miscellaneous scheduled and otherwise indicated Equipment:
   1. Library Equipment, tagged and scheduled as Mark L-x on Drawing A312.
   2. Art equipment, tagged and scheduled as Mark A-xx on Drawing A340
   3. Safety Wall Padding

PART 2 - PRODUCTS

2.01 MANUFACTURERS AND PRODUCTS

A. General Product and Manufacturer requirements and limitations:
   1. Basis-of-Design Product: The design is based on the product or system scheduled or otherwise shown on the Drawings.
   2. It is the intent of this specification to establish performance and quality criteria consistent with established standards of design and function herein described. Work not meeting these minimum standards will not be accepted.
   3. Where a product is scheduled or specified, provide the products indicated.
   4. Where a manufacturer is specified, provide products by one of the manufacturers specified.
   5. Products by other manufacturers will be acceptable only in compliance with the requirements for Product Substitutions and Comparable Products in Section 01 6000 “Products”
      a. Specific materials, finish options, construction details, modularity, hardware and test data will be held in strict compliance.

B. Art Spray Booth:
   1. Air management for simple nontoxic exhaust operations in Art Room C138
      a. Pain Spray Booth with Explosion-Proof Light and Blower, model as scheduled by Air Master Systems
         1) 36-inch-wide unit, design flow 755 CFM at 100 LFM.
         2) Provide blower, switch and integral wiring.
         3) Provide integral blower switch, box, faceplate, conduit, and wiring.
         4) Duct connection to be provided by HC.
         5) Connection to power and to blower by EC
   2. Constant exhaust volume, with air filters in upper back of hood serving as diffusers to promote more uniform airflow at face opening.
   4. Required Features:
      a. Incandescent Vapor Proof light fixture with 300 W bulb
      b. Filter
      c. Explosion Proof Switches:
1) Light Switch: 15A 125VAC single pole light switch; Mount of left side of booth.
2) Blower Switch with pilot: double pole switch for up to 1 hp single phase 115VAC motor; Mount on right side of booth. Include indicator light, thermal overload protector.
   d. Provide integral wiring, conduit, boxes, faceplates, and wiring accessories. Final electrical connections to power source by EC.

C. Wall-Mounted Safety Padding:
   1. Basis-of-Design: Model 4130 Wall Padding “Class A Fire Wall Pads” by Performance Sports Systems
   2. Acceptable products, subject to compliance with requirements:
      a. Safeguard Plus by Resilite Sports Products, Inc
      b. Ecovision Fire Rated Wall Pads by Draper
   3. Panel Description:
      a. 2'-0" wide x 6'-0" high panel module, with 2” thick flexible open cell neoprene cushioning material bonded to 7/16" wood backing board and fully wrapped with flame retardant vinyl. Provide nailing margin as detailed.
      b. Provide Custom panels as required to accommodate layouts as indicated on the Drawings or as required by adjacent construction including corner returns and finished cutouts where shown.
      c. Panel front and edges shall be fully wrapped and secured to the wood backer so that the backer is not exposed.
   4. Flexible PVC and scrim laminate with leather grain emboss pattern, treated with anti-fungal and anti-bacterial agents, UV resistant, and easily cleaned using mild soap and water.
      a. Cover shall have average weight of 14 oz. per square yard, breaking strength of 350 PSI, tear resistance of 65 pounds.
   5. Provide wall attachment system with a smooth neat appearance with the capability of removing the panels to allow worn or vandalized panels to be repaired or replaced by simply lifting the panel upward.
   6. Color: As scheduled or as selected by Architect from Manufacturer’s full range.
   7. Provide documentation to verify compliance with required standards and certifications.
      b. Low emitting requirements of GREENGUARD for Children and Schools.
      d. Surface-burning characteristics, UL tested per ASTM E-84:
         1) Flame-spread index of 25 or less
         2) Smoke-developed index of 450 or less

2.02 FINISHES

A. Steel Finishes: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
   1. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat.

B. Stainless-Steel Finishes: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Remove tool and die
marks and stretch lines or blend into finish. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

1. Bright, Directional Polish: No. 4 finish.

C. Wood Finishes: Factory finished with manufacturer's standard stain, sealer, and clear finish coat. Defer only final touchup until after installation.

END OF SECTION 11 5011
SECTION 11 5314 – CASEWORK EXHAUST EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:
   1. Spray booth assembly for Art Rooms.
   2. Laboratory fume hoods for Science classrooms.
   3. Laboratory gas, air, ventilation, and electrical service fittings in fume hoods.
   4. Piping and wiring within fume hoods for service fittings, light fixtures, switches, and other electrical devices.

B. Related Sections include the following:
   1. Division 9 Section "Gypsum Board Assemblies" for bulkheads and reinforcements in metal-framed gypsum board partitions for anchoring fume hoods.
   2. Division 12 Section “Manufactured Wood Casework” for base cabinets supporting fume hood.
   3. Division 20 through 26 Sections for
      a. Blowers, except as indicated
      b. Fume hood duct connections, including ducts.
      c. Connecting service utilities at back of fume hoods.
      d. Field quality-control testing of fume hoods.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   2. Fisher Hamilton L.L.C.
   3. Kewaunee Scientific Corporation; Laboratory Division.

2.02 MATERIALS

A. Steel Sheet: Cold-rolled commercial steel sheet, complying with ASTM A 1008/A 1008M; matte finish; suitable for exposed applications.

B. Stainless-Steel Sheet: ASTM A 666, Type 304; stretcher-leveled standard of flatness.

C. Phenolic Composite: Cellulose-fiber-reinforced phenolic resin, laminated under high temperature and pressure; with pigmented, chemical-resistant, melamine-resin surface.

D. Glass-Fiber Cement Board: ASTM C 1186.

E. Laminated Safety Glass: ASTM C 1172, Kind LT, Condition A, Type I, Class I, Quality q3 with clear, polyvinyl butyral interlayer.
F. Fasteners: Provide stainless-steel fasteners where exposed to fumes.

2.03 SPRAY BOOTH ASSEMBLY

A. Air Management for simple nontoxic exhaust operations in the following spaces:
   1. Art 3D, Room D111
   2. Art 5, Room D133
   3. Art 6, Room D132

B. Constant exhaust volume, with air filters in upper back of hood serving as diffusers to promote more uniform airflow at face opening.
   1. Spray Booth Model #AMS 36SB with Blower Model #7C039 by Air Master Systems
      a. Art Room: Provide blower, switch and integral wiring. Duct connection by HC.
   2. 36-inch-wide unit with 773 CFM at 100 LFM, and 9-inch-diameter duct.

C. Construction:
   1. 18 gauge chemical resistant painted sheet steel.
   2. Plastic laminate base cabinet.

D. Required Features:
   1. Incandescent Vapor Proof light fixture with 300 W bulb
   2. Filter
   3. Explosion Proof Switches:
      a. Light Switch: 15A 125VAC single pole light switch; Mount of left side of booth.
      b. Blower Switch with pilot: double pole switch for up to 1 hp single phase 115VAC motor; Mount on right side of booth. Include indicator light, thermal overload protector.
   4. Provide integral wiring, conduit, boxes, faceplates, and wiring accessories. Final electrical connections to power source by EC.

2.04 FUME HOOD ASSEMBLY

A. Double-Sided Air Foil conventional bypass hood to exhaust fumes while allowing access, pass-through and observation from both sides. Provide unit designed for constant exhaust volume, drawing air through either or both open sashes or through the bypass chamber when sash is closed.
   1. Millennia Double Sided Air Foil Model #48MDS by Air Master Systems.
      a. Compatible blower to be provided by HC. Provide integral blower switch, box, faceplate, conduit, and wiring. Connection to power and to blower by EC.
   2. 48 inches wide with 770 CFM at 100 LFM, and 9 inch diameter duct.

B. Construction:
   1. Outer wall: Chemically resistant powder coated sheet steel.
   2. Double sidewall construction with 5-inch-chase area for plumbing and electrical fixture installation.
   3. Fixed view panel.
   4. Interior Lining: 16 gauge type 304 stainless steel with No.4 finish. Integral dished work top includes standard 3-inch by 6-inch stainless steel cup sink as shown on Drawings.
   5. Airfoil: Front and back openings with 45 degree angle fascia that to reduces turbulence. Bottom horizontal airfoil directs current of air at counter top level to purge heavy fumes.
C. Required Features:
1. Fluorescent light fixture (bulbs included) accessed from outside air chamber.
2. Stainless steel airfoil.
4. Louvered front panel.
5. Ceiling enclosure to match hood
6. Remote control baffle
7. Gasketed access panel
8. Light switch in single gang box with faceplate.
9. Blower switch in single-gang box with faceplate, indicator light, thermal overload protector for up to 1 hp single phase 115 VAC motor
10. 2 duplex outlets (one each side) with ground-fault interrupters
11. Laboratory plumbing fixtures with LAB-COTE plastic finishes, located as shown in Drawings:
   a. RCGAS Gas hook up with thermal switch and pilot light mounted in fume hood.
      Color: Blue
      Mount operating valve @ Exterior Right Side of Cabinet 12 inches above finished countertop typ both sides.
   b. RCAIR Air hook-up. Color: Orange.
      Mount operating valve @ Exterior Left Side of Cabinet 5 inches above finished countertop typ both sides.
   c. RCGN Gooseneck cold-water faucet at cup sink. Color: Green.
      Mount operating valve @ Exterior Right Side of Cabinet 5” above finished countertop typ both sides.

2.05 FABRICATION

A. General: Preassemble fume hoods in factory to greatest extent possible. Disassemble fume hoods only as necessary for shipping and handling limitations. Fume hoods shall be capable of being partly disassembled as necessary to permit movement through a 35-by-79-inch door opening.

B. Steel Exterior: Fabricate from steel sheet, not less than 0.0478 inch thick, with component parts screwed together to allow removal of end panels, front fascia, and airfoil and to allow access to plumbing lines and service fittings. Apply chemical-resistant finish to interior and exterior surfaces of component parts before assembly.

C. Ends: Fabricate with double-wall end panels without projecting corner posts or other obstructions to interfere with smooth, even airflow. Close area between double walls at front of fume hood and as needed to house sash counterbalance weights, utility lines, and remote-control valves.

D. Splay top and sides of face opening to provide an aerodynamic shape to ensure smooth, even flow of air into fume hood.

E. Lining Assembly: Unless otherwise indicated, assemble with stainless-steel fasteners or epoxy adhesive, concealed where possible. Seal joints by filling with chemical-resistant sealant during assembly.
   1. Fasten lining components to a rigid frame assembly fabricated from steel and to which exterior panels are attached. Use concealed fasteners only.
   2. Punch fume hood lining side panels to receive service fittings and remote controls. Provide removable plug buttons for holes not used for indicated fittings.
F. Exhaust Plenum: Full width of fume hood and with adequate volume to provide uniform airflow from hood, of same material as hood lining, and with duct stub for exhaust connection.

G. Bypass Grilles: Provide grilles at bypass openings of bypass.

H. Sashes: Provide manufacturer’s standard operable sash of type indicated, subject to compliance with requirements and Architect’s approval.

I. Light Fixtures: Provide vaporproof, two-tube, rapid-start, fluorescent light fixtures, of longest practicable length; complete with tubes at each hood. Shield tubes from hood interior with 1/4-inch-thick laminated glass or 3-mm-thick tempered glass, sealed into hood with chemical-resistant rubber gaskets. Provide units with fluorescent tubes easily replaceable from outside of fume hood.
   1. Provide fluorescent tubes with color temperature of 3500 K and minimum color-rendering index of 85.

J. Base Cabinets: As per Division 12 Section "Wood Laboratory Casework."

K. Filler Strips: Provide as needed to close spaces between fume hoods and adjacent building construction. Fabricate from same material and with same finish as fume hoods or fume hood base cabinets, as applicable.

L. Comply with requirements in Divisions 15 and 16 Sections for installing water and laboratory gas service fittings, piping, electrical devices, and wiring. Install according to Shop Drawings. Securely anchor fittings, piping, and conduit to fume hoods, unless otherwise indicated.

2.06 ACCESSORIES

A. Service Fittings: Comply with requirements in Division 12 Section "Manufactured Wood Casework."
   1. Provide service fittings with exposed surfaces, including fittings, escutcheons, and trim, finished with acid- and solvent-resistant, baked-on plastic coating in manufacturer's standard color as approved by Architect.

B. Airflow Indicator: Subject to compliance with requirements and Architect’s approval, provide fume hoods with airflow indicator of one of the following types:
   1. Direct-reading aneroid (Magnehelic-type) gage that measures fume hood exhaust duct static pressure as an indication of airflow.
   2. Thermal anemometer that measures fume hood face velocity and indicates whether it is below normal, normal, or above normal.
   3. Thermal anemometer that measures fume hood face velocity and displays data as digital readout.

C. Airflow Alarm: Provide fume hoods with audible and visual alarm that activates when airflow sensor reading is outside of preset range.
   1. Provide with either thermal-anemometer or aneroid (Magnehelic-type) gage airflow sensor.
   2. Provide with reset and test switches.
   3. Provide with switch that silences audible alarm and automatically resets when airflow returns to within preset range.
D. Sash Alarm: Provide fume hoods with audible and visual alarm that activates when sash is opened beyond preset position.
   1. Provide with silence and test switches.

E. Sash Stops: Provide fume hoods with sash stops to limit hood opening to 18-inches high. Sash stops can be manually released to open sash fully for cleaning fume hood and for placing large apparatus within fume hood.

F. Bypass Grille Blank-off Panel: Provide fume hoods with blank-off panel on bypass grille designed for use with sash stops to reduce exhaust air volume and provide design face velocity with sash at 50 percent open position.

END OF SECTION 11 5314
SECTION 11 6623 - GYMNASIUM EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following gymnasium equipment:
   1. Basketball goals, backstop and scoreboard assemblies
   2. Volleyball equipment
   3. Gymnasium Divider Curtain
   4. Safety Wall Padding.
   5. Chin-up Bars
   6. Peg Boards

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis-of-Design Products, except as otherwise noted: Performance Sports Systems, Noblesville, IN
   1. Named Manufacturer's Products: Product designation of Basis-of-Design manufacturer is listed for each product type, for the purpose of establishing minimum requirements.
   2. The approval of other manufacturer’s names and product numbers do not relieve the contractor from furnishing products complying with specified requirements.
   3. Manufacturer’s products shall be standard cataloged items and shall be a consistently offered line of equipment. Manufacturer's published literature must clearly show that the products being furnished are in compliance with these specifications.

B. Subject to compliance with requirements, provide either the named products, or accepted product similar in visual appearance, function, quality and construction by one of the other manufacturers specified. Use of products other than named Basis-of-Design products requires written notice to all Contractors.
   1. Jaypro Sports, Inc.
   2. Porter Athletic
   3. Draper, Inc.

2.02 MATERIALS, GENERAL

A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated; mill finish or decorative, baked-enamel, powder-coat finish.
   1. Extruded Bars, Profiles, and Tubes: ASTM B 221.

B. Steel: Comply with the following:
   3. Cold-Formed Steel Tubing: ASTM A 500, Grade B, unless another grade is required by structural loads.
4. Steel Mechanical Tubing: Cold-rolled, electric-resistance-welded carbon or alloy steel tubing complying with ASTM A 513 or steel tubing fabricated from steel complying with ASTM A 569 and complying with the dimensional tolerances in ASTM A 500.


D. Wood-Based, Structural-Use Panels: Comply with DOC PS 2; for plywood, comply with DOC PS 1.

E. Equipment Mounting Pads: Wood, transparent or neutral color painted finish, size, and quantity as required to mount gymnasium equipment according to manufacturer's written recommendations.

F. Anchors, Fasteners, Fittings and Hardware: Manufacturer's standard corrosion-resistant or noncorrodible units; concealed tamperproof, vandal and theft resistant. Provide as required for gymnasium equipment assembly, mounting, and secure attachment.

G. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107 with minimum strength recommended in writing by gymnasium equipment manufacturer.

2.03 EQUIPMENT CONTROLLER

A. Model No. TSC2000 Key Pad Group Controller by Performance Sports Systems
1. Each pad shall utilize twenty multi-function keys with an illuminated 20-character LCD display for easy read-out. One pad and one relay panel shall operate eight motorized systems and two 15 amp. auxiliary operations. The pad shall be password controlled to prevent unauthorized operation with auto shut-off after thirty seconds of non-use.
2. A Model No. TSC-DG display guard shall cover each pad and shall have a clear polycarbonate window in a gray painted .188 inches thick lockable die-cast aluminum frame.
3. There shall be no more than 24 volts of direct current allowed at the pad. Any switching mechanism requiring keys or having line voltage of 110 at the switch will not be accepted. Mechanisms without a security code will not be accepted. The pad shall be located so that the equipment is in full view of the operator.
4. System shall operate equipment individually and have custom program options for multiple equipment configurations. Unit shall be self-diagnostic and have a voltage-sensing shutdown feature in case of overload and will recommend electrical maintenance if necessary. Relay panel shall have back-up switches to operate equipment in the event of pad failure.
5. The warranty shall be for one year for workmanship and material. The electrical contractor shall be responsible for installation, wiring and connection.
2.04 BASKETBALL EQUIPMENT

A. Main Gym East Side Courts Basketball Backstops:

Model No. 3103 “Single Drop” Ceiling Suspended, Rear Braced Forward Fold Backstop by Performance Sports Systems

1. Backstops shall be welded in accordance with American Welding Society, (AWS), D1.1 “Structural Welding Code-Steel.

2. Mast and sway braces to be fully welded.

3. Vertical front drop frame assembly "Single Drop" shall consist of main center mast of 6-5/8” O.D., .120” heavy wall, structural steel tube with welded diagonal side sway braces of 2-1/2” x 1-1/2” x 14 gauge rectangular steel tubing. Sway braces should attach to the mast no higher than 24” above the backboard for maximum rigidity. Top of mast is welded to a heavy 4” x 1-1/2” x 0.18” web structural steel channel. Mast and sway braces shall be welded for ceiling heights up to forty (40) feet. The brace shall be a minimum of 1-7/8” O.D. x 12 gauge structural tube assembly with a slide mechanism and steel bushing for travel on a 1-7/8” O.D. slide rod allowing for exact positioning at installation and maintenance free operation. The entire assembly shall be self-aligning and designed to be self-locking and self-releasing automatically by the simple tensioning of the cable during the act of raising the backstop into its stored position.

4. Goal shall mount directly through backboard and into a heavy structural steel weldment which shall be clamped to the vertical 6-5/8” O.D. center mast. This direct attachment feature transfers the load on the goal directly to the mast to minimize stress to the glass backboard. Goal and backboard mounting design shall conform to NCAA, NFHS, and FIBA regulations.

5. The main mast will be suspended from superstructure with a 0.875” diameter drop-forged offset hanger 3” in front of the pivot point. Units with less than 3” offset have been determined to be inferior. Backstop shall be manufactured to allow 6” vertical adjustment for plumbing the bank board. Backstop shall be raised and lowered with 1/4” galvanized aircraft cable with a breaking strength of 7000 pounds. Cable shall automatically retract by means of a 5/16” diameter shock cord.

6. Backstop shall be supported from 3-1/2” O.D. x 0.120” pipe anchored to roof framing members by means of heavy formed steel support fittings. Superstructure pipes to be reinforced with special bridging or bracing when truss centers exceed spans of 14 feet. Each attachment clamp must be capable of supporting a static load of at least 10,000 lbs with no deflection.

7. All metal parts shall have one coat of primer and have a finish coat of white, semi-gloss enamel. Application of a primer finish only regardless of color shall not be considered as equal. All metal parts will be packaged for protection during shipment from manufacturer. Architect has the option of choosing from seven additional colors at no extra cost. Color options include black, red, blue, dark blue, dark green, gray, and yellow. Manufacturer to provide color samples upon request.
B. Main Gym Main Court Basketball Backstops:

**Model No. 3105 “Single Drop” Ceiling Suspended, Rear Braced Rear Fold Backstop** by Performance Sports Systems.

1. Backstops shall be welded in accordance with American Welding Society, (AWS), D1.1 “Structural Welding Code-Steel.

2. Mast and sway braces to be fully welded.

3. Vertical front drop frame assembly "Single Drop" shall consist of main center mast of 6-5/8” O.D., 0.120” heavy wall, structural steel tube with welded diagonal side sway braces of 2-1/2” x 1-1/2” x 14 gauge rectangular steel tubing. Sway braces should attach to the mast no higher than 24” above the backboard for maximum rigidity. Top of mast is welded to a heavy 4” x 1-1/2” x 0.18” web structural steel channel. Mast and sway braces shall be welded for ceiling heights up to forty (40) feet. Backstop shall be braced to the rear and shall fold backward. The rear brace assembly shall have a fully adjustable folding knee joint allowing for exact playing position and maintenance free operation. Attachment to main mast shall be between 12” and 18” above bottom of main mast.

4. Goal shall mount directly through backboard and into a heavy structural steel weldment which shall be clamped to the vertical 6-5/8” O.D. center mast. This direct attachment feature transfers the load on the goal directly to the mast to minimize stress to the glass backboard. Goal and backboard mounting design shall conform to NCAA, NFHS and FIBA regulations.

5. The main mast will be suspended from superstructure with a 0.875” diameter drop-forged offset hanger 3” in front of the pivot point. Units with less than 3” offset have been determined to be inferior. Backstop shall be manufactured to allow 6” vertical adjustment for plumbing the bank board. The adjustable hangars will provide for precise plumbing of the frame during installation to offset any variations in the building structure. Any backstop that does not utilize adjustable hangars will not be considered as equal. Backstop shall be raised and lowered with ¼” galvanized aircraft cable with a breaking strength of 7000 pounds.

6. Backstop retracting mechanism shall be a 1-7/8” brace assembly with an adjustable folding knee-joint assembly for precise field adjustment during installation. Knee joint locks backstop in playing position and is easily engaged for retraction by cable tension. Knee joint shall come standard with an integral safety cable.

7. Backstop shall be supported from 3-1/2” O.D. pipe anchored to roof framing members by means of heavy formed steel support fittings. Superstructure pipes to be reinforced with special bridging or bracing when truss centers exceed spans of 14 feet. Each attachment clamp must be capable of supporting a static load of at least 10,000 lbs with no deflection.

8. All metal parts shall have one coat of primer and have a finish coat of white, semi-gloss enamel. Application of a primer finish only regardless of color shall not be considered as equal. All metal parts will be packaged for protection during shipment from manufacturer. Architect has the option of choosing from seven additional colors at no extra cost. Color options include black, red, blue, dark blue, dark green, gray, and yellow. Manufacturer to provide color samples upon request.
C. Gym South Side Court Basketball Backstops:

**Model No. 3107 “Single Drop” Ceiling Suspended, Front Braced Front Fold Backstop** by

1. Backstops shall be welded in accordance with American Welding Society, (AWS), D1.1
   "Structural Welding Code-Steel.

2. Mast and sway braces to be fully welded.

3. Vertical front drop frame assembly "Single Drop" shall consist of main center mast of 6-5/8”
   O.D., 0.120” heavy wall, structural steel tube with welded diagonal side sway braces of
   2-1/2” x 1-1/2” x 14 gauge rectangular steel tubing. Sway braces should attach to the mast
   no higher than 24” above the backboard for maximum rigidity. Top of mast is welded to a
   heavy 4” x 1-1/2” x 0.18” web structural steel channel. Mast and sway braces shall be
   welded for ceiling heights up to forty (40) feet. Backstop shall be braced to the front and
   shall fold forward. The front brace assembly shall have a fully adjustable folding knee joint
   allowing for exact playing position and maintenance free operation. Attachment to main
   mast shall be between 12” and 18” above bottom of main mast

4. Goal shall mount directly through backboard and into a heavy structural steel weldment
   which shall be clamped to the vertical 6-5/8” O.D. center mast. This direct attachment
   feature transfers the load on the goal directly to the mast to minimize stress to the glass
   backboard. Goal and backboard mounting design shall conform to NCAA, NFSHSA and
   FIBA regulations.

5. The main mast will be suspended from superstructure with a 0.875” diameter drop-forged
   offset hanger 3” in front of the pivot point. Units with less than 3” offset have been
   determined to be inferior. Backstop shall be manufactured to allow 6” vertical adjustment for
   plumbing the bank board. The adjustable hangars will provide for precise plumbing of the
   frame during installation to offset any variations in the building structure. Any backstop that
   does not utilize adjustable hangars will not be considered as equal. Backstop shall be raised
   and lowered with 1/4” galvanized aircraft cable with a breaking strength of 7000 pounds.

6. Backstop retracting mechanism shall be a 1-7/8” brace assembly with an adjustable folding
   knee-joint assembly for precise field adjustment during installation. Knee joint locks
   backstop in playing position and is easily engaged for retraction by cable tension. Knee joint
   shall come standard with an integral safety cable.

7. Backstop shall be supported from 3-1/2” O.D. pipe anchored to roof framing members by
   means of heavy formed steel support fittings. Superstructure pipes to be reinforced with
   special bridging or bracing when truss centers exceed spans of 14 feet. Each attachment
   clamp must be capable of supporting a static load of at least 10,000 lbs. with no deflection.

8. All metal parts shall have one coat of primer and have a finish coat of white, semi-gloss
   enamel. Application of a primer finish only regardless of color shall not be considered as
   equal. All metal parts will be packaged for protection during shipment from manufacturer.
   Architect has the option of choosing from seven additional colors at no extra cost. Color
   options include black, red, blue, dark blue, dark green, gray, and yellow. Manufacturer to
   provide color samples upon request.

D. Auxiliary Gym All Side Court Basketball Backstops:

**Model No. 1170 Electric Height Adjuster** by Performance Sports Systems.

1. Electric height adjusters shall be manufactured of steel using and electrically operated linear
   actuator to raise and lower backboards from 8’ to 10’ off finished floor. Linear actuator
   shall be powered by a 115 volt single phase motor and contain built-in limit switches to

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**ADDITIONS AND ALTERATIONS**

**GROVE CITY AREA SCHOOL DISTRICT**

**HILLVIEW ELEMENTARY SCHOOL**

**GYMNASIUM EQUIPMENT**

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ensure safe operation and positive stopping at 8’ and 10’ heights. A height indicator label located on the unit shall allow visual determination of setting in 3” increments. Adjust-A-Goal shall be operated through a key pad operation. Wiring and connectors from the top of the backstops to and including the actuator shall be provided by the basketball equipment manufacturer.

2.05 BACKBOARDS

A. Rectangular Glass Backboard
1. **Model No. AFRG42 Rectangular Glass Backboard**, by Performance Sports Systems, to include 2” thick Model No. PMCE bolt-on edge padding with 7 standard colors.
2. Backboard shall be 42 inches high by 72 inches wide.
3. Backboard shall be manufactured from ½” tempered glass set in heavy extruded aluminum framing and cushioned by shock absorbing vinyl. Official border and target area is fired into the glass.
4. Direct Attach goal mounting structure shall be a heavy, welded, formed steel assembly, which shall be directly attached to the main mast of a backstop to minimize stress on the glass section. Backboard shall attach through glass to direct attach mounting structure.
5. Backboard shall be protected by a limited, lifetime warranty against breakage when used on a direct attach support system. The board must meet NCAA, FIBA and NFSHSA specifications.

2.06 BREAKAWAY GOALS

1. Goal shall be fabricated from 5/8” diameter cold drawn alloy steel round formed to an 18” inside diameter ring with full wing brace. Inside of ring shall be positioned 6” from face of backboard by heavy, formed steel hinged type housing with removable cover to conceal mounting bolts and entire shock absorption mechanism of goal, and also protect against finger entrapment.
2. Goal shall be designed to absorb shock loads due to slam dunking or hanging on the rim. Shock absorption feature shall be provided by means of a special offset hinge arrangement rim and back plate mounting housing and concealed return springs.
3. Function of goal shall meet the NCAA, FIBA and NFSHSA specification on moveable rims, which states, "A moveable basket ring shall have rebound characteristics identical to those of a non-moveable ring." Goal shall be set at factory for proper flex and rebound requirements.
4. Goal shall be finished in a durable, electrostatic powder coated official orange finish.
5. Goal shall be furnished complete with a heavy-duty, white, anti-whip nylon net and mounting hardware.

2.07 ELECTRIC WINCHES – All Backstops and Scoreboard Structure

A. **Model No. 1194 Winch** by Performance Sports Systems.
1. The backstop-positioning winch shall be a definite purpose electric winch designed specifically for use of basketball backstop positioning. The winch shall be a worm gear type designed to hold the backstop at any position during operation. The winch will be driven by a minimum 3/4-HP, direct drive, instant reversing, 120-volt, single-phase instant reversing motor with thermal overload protection manufactured to NEMA specifications and gear driven limit switches. The winch shall lift an 1800 pound backstop assembly pulling at a speed of 12 feet per minute.

2. The winch employs a double worm reduction gear system and uses self-lubricating, composite materials that are completely oil free. The winch shall require no oil and no V-belts or chains and should be completely maintenance free.

3. The winch shall have a uni-directional worm brake and an inherently self-locking composite worm drive, to assure positive dynamic braking and reliable holding of the drum cable.

4. The drum shall be grooved for a 1/4”, 7 x 19 galvanized aircraft cable to facilitate smooth take-up of the cable and proper spooling of the cable. Drum shall allow 25 feet of travel on one layer, and 40 feet on two layers. Drum shall be supplied with a pressure roller, with torsion spring tensioning to ensure that the cable ‘tracks’ in the grooves to prevent bunching up and wear and tear on the cable even under slack cable conditions.

5. Wiring of all electrical components shall be in accordance with local area codes, and in accordance with manufacturer's instructions. All conduit, wiring, junction boxes, and components not specified herein shall be furnished and installed by the Electrical Contractor.

6. A key pad group controller shall be utilized to both raise and lower the backstops eliminating the need for keys. The key pad shall be located so that the equipment is in full view of the operator.

7. Winch shall have a two-year replacement warranty for all product defects.
2.08 SAFETY STRAPS

A. **Model No. 1100 Strap** by Performance Sports Systems
   1. Lock shall be directly speed sensitive to automatically lock a basketball backstop in position at any time in storage or during the raising or lowering cycle due to a sudden surge of speed created by a possible malfunction of the hoisting apparatus, such as the winch, cable, pulleys, support fittings, etc. Any increase in cycle speed or tension, whether sudden or gradual, immediately activates the locking device.
   2. Safety strap shall incorporate a 2-inch wide nylon belt rated at a 6,000 pound breaking strength. The entire unit to be tested to withstand a 1,500-pound free fall load and rated at 1000 pounds. Strap shall extend a maximum of 35 feet and shall have a safety alert to indicate the maximum safe extension. Operation and locking action of strap shall be by means of components activated by centrifugal force to lock a basketball backstop. Unit shall incorporate a fully automatic reset requiring no poles, ropes, levers, or buttons. The strap shall incorporate an indicator to show if the unit has been subjected to a heavy load.
   3. The locking mechanism must be self-checking, meaning that during normal use the mechanism is in constant motion to prevent log term binding or seizing caused by dirt or corrosion. The mechanism shall actively and positively confirm, six times per revolution, that the reel is traveling at a safe speed, below 1.5 feet per second.
   4. Unit shall be furnished with a universal mounting bracket to fit on any size pipe mounted either parallel or at right angles to unit. Belt shall be supplied with a special be connection bracket for ease of securing directly to the basketball backstop.
   5. Any safety straps that do not incorporate indicators that the stop has been engaged will not be considered equal.

2.09 GYMNASIUM DIVIDER CURTAIN

A. **Model No. 4040XL Top-Roll Roll Divider Curtain** by Performance Sports Systems.
   1. Lower 8-foot vinyl section of curtain shall be solid vinyl coated polyester, 19 oz. per square yard. Flammability rated as self-extinguishing by the California State Fire Code. All seams to be welded with a full 1-in contact weld. A padded pocket shall be formed along bottom edge of curtain to accommodate batten pipe for curtain support. Color as selected by Architect from Manufacturer’s standard colors.
   2. Upper section of curtain shall be avg. 9 oz. per square yard vinyl coated polyester mesh. Flammability rated as self-extinguishing by the California State Fire Code. Color as selected by Architect from Manufacturer’s standard colors.
   3. Suspension from roof structure by directly attaching to the underneath side of the roof structure with clamping hardware by curtain Manufacturer. Drive shaft shall be supported by a carrier assembly spaced 9 ft +/- 2 ft O.C. Center support shall consist of a formed bracket with steel rollers on which the drive shaft shall rotate. Rolling action shall be from the top, without the use of straps, belts or cables. Drive pipe support assembly shall be compact to allow for stored dimension of approximately 14 inches. Steel rollers shall have permanently lubricated bearings for effortless movement of vinyl. All structure finish will be baked on black powder coat.
4. Curtain shall be operated by 120 volt single phase reversible motor or motors, maintenance free, permanently lubricated with over heating protection. Junction boxes shall be mounted within 6’ of motor(s). Motors shall provide electromagnetic disc braking for smooth and accurate stop without slippage and full braking power in the event of a power failure. Include limit switches to control the upper and lower limit of the curtain travel with two locking push buttons. All electrical components shall be neatly contained in overhead superstructure. Curtain power shall be on a dedicated circuit. All wiring between the motor cable retractor reels, the synchronizer box, power wiring to the synchronizer and all other electrical junction boxes shall be furnished and installed by a certified electrical contractor.

5. A 24 v. key pad group controller shall raise and lower the divider curtain eliminating the need for keys. Motors using V-belts and chains and that require additional lubrication and maintenance will not be accepted. Key pad group controller shall be located so that the curtain is in full view of the operator.

6. Motors shall have a five-year replacement warranty against defects and workmanship. Vinyl shall have a one year warranty against defects and workmanship.

2.10 VOLLEYBALL GAME STANDARDS AND EQUIPMENT

A. Model 6000 System by Performance Sports Systems.
1. General: Provide equipment complying with requirements in NAGWS's "NAGWS Volleyball Rulebook, NFHS Volleyball Rule Book and USA Volleyball Rule Book."

2. Volleyball Uprights – 3 pair
   a. Extruded high-strength 3-1/2” O.D. anodized aluminum tubing, unit weight not to exceed 38.5 lbs.
   b. Uprights shall be designed to fit 3-1/2” inch diameter and 10-1/2 inch deep sleeves with modified uprights being unacceptable. Uprights shall be useable without guys.
   c. Each upright shall be a maximum 3-1/2” inch in diameter and shall store and set up in one single piece. The bottom of the upright shall have a non-skid, non-marking rubber insert to protect the gym floor and provide precise height adjustment. The net tensioning device shall have a positive release mechanism for easy release of net tension with folding crank handle for added safety.
   d. Sliding collars provide infinite height adjustment from Men’s height and lower including tennis and badminton with positive release mechanism.
   e. Must be endorsed/certified by NFHS, NCAA and match USA Volleyball requirements.
   f. Warranty on posts shall be limited 10 years with a 3 year limited warranty on winch assembly.

B. Volleyball floor plate and sleeves:
   Model Nos. 6422 and 6400 by Performance Sports Systems (Eight or 4 pair)
   1. Floor plate shall be solid brass with 6 5/8" I.D. with locking hinged access cover.
   2. Removable, threaded, or pin swivel covers are unacceptable.
   3. Plate shall be 0.56 inches thick and shall be designed to be compatible with all floor surfaces. In a wood floor, the plate shall be fastened only to the wood floor so that it can move with any expansion or contraction of the floor.
4. Sleeve shall be tubular steel of .140 inch thickness, minimum of 10 1/2 inches long and accept 3 1/2" diameter posts. Sleeve shall be set at the appropriate height to provide competition net heights.

5. Sleeve shall have three pre-drilled flanges for attachment to the plate during the installation in accordance with manufacturer’s instructions.

C. Volleyball Upright protective padding:
   Model No. 6010 by Performance Sports Systems (3 pair)
   1. Pads shall be single piece with three panels of 1-1/4" urethane foam.
   2. Pads shall measure 6'-0" in height and have a slot on front panel to allow net cable access.
   3. Side panels close to the back of the upright and close with Velcro straps with entire assembly covered with 14 oz. vinyl.

D. Volleyball Net:
   Model No. 7600 by Performance Sports Systems (3 nets)
   1. Net shall be 32 feet in length and 1 meter (39") wide with black nylon mesh measuring 4 x 4 inches square. Net shall have white 3-1/2" double thickness double stitched vinyl coated hem on sides and 2-1/2" double thickness double stitched vinyl coated hem at top and bottom with end sleeves with 1" diameter wooden dowels. There shall be a 1/8" diameter steel 7 x 19, 33'-6" feet in length, through the top of the free floating net. Nylon straps with buckle hardware shall secure and tension net in place for volleyball or tennis. The net shall also be provided with net cable covers (6251) and Velcro sideline markers (6413).

E. Volleyball Net Antennae:
   Model No. 6412 by Performance Sports Systems (3 pair)
   1. Shall be plastic, red and white in color, and have mechanical clamps for attachment to the top and bottom cables of the net. Antennae shall be adjustable to fit either 36" or 1 meter wide nets and can be attached to the net while standing on the floor. should not have a removable rubber cap at the bottom

F. Volleyball Storage/Transport System:
   Model No.6295 by Performance Sports Systems (one)
   1. Cart shall be constructed of rectangular steel tubing and come equipped with four swivel casters providing easy movement and non-marring action. The cart shall be equipped with permanent hooks, with padding to prevent scratches to the uprights, which provide storage space for up to six volleyball uprights. The cart shall also provide a vinyl storage compartment for additional items such as balls and nets. Overall dimensions are 48"L x 38-1/2"H x 29-3/4"W.

G. Official’s Stand and Pads:
   Model Nos. 6446 and 6040 by Performance Sports Systems (3 stands with pads)
   1. Shall be constructed of 1" tubular steel with steel platform and non-adjustable tubular legs with non-marring rubber caps. Stand dimensions are: 83"H x 24"W. Safety bars will be located 34" above the platform. 1” stand padding will be cross-linked polyethylene closed cell foam with 14 oz. nylon reinforced vinyl covering and will attach around the rails, platform and legs with Velcro straps.
   2. Pads color: as selected by Architect.
2.11 SAFETY WALL PADDING (FIRE RETARDANT WALL PADDING)

A. Class A- Fire Retardant Safety Wall padding.
   **Model 4130 Wall Padding** “Class A Fire Wall Pads” by Performance Sports Systems
   1. Provide wall wainscot padding as shown on drawings. Each panel shall be 2’-0” wide x 6’-0” high. Foam filler shall be 2” thick CR SafGuard neoprene. Foam shall be cemented to 7/16” wood backing board and covered with flame retardant, vinyl meeting ASTM 84 with a Class A rating, folded and stapled to back of board. Provide 1” nailing margin at pad bottom. The cover material shall have anti-fungal and anti-bacterial agents and is easily cleaned using mild soap and water.
   2. Surface-burning characteristics, UL tested per ASTM E-84:
      a. Flame-spread index of 25 or less
      b. Smoke-developed index of 450 or less
   3. Pad covers flame resistance ratings: passes NFPA 701
   4. Provide Custom panels as required to accommodate layouts as indicated on the Drawings or as required by adjacent construction including corner returns and finished cutouts where shown.

B. Panel Attachment Clips
   1. Provide panel attachment clips and a wall attachment system with a smooth neat appearance with the capability of removing the panels to allow worn or vandalized panels to be repaired or replaced by simply lifting the panel upward. Clips are furnished in heavy, precision aluminum (6063-15) extrusions with attachment holes pre-drilled.
   2. Pad clips engage wall clips for a quick, easy and invisible attachment.
   3. Z-clip attachment at pad top shall be provided for all wainscot pads

2.12 CHINNING BAR

A. Adjustable Chinning Bar:
   **Model No. EWM-30** by Jaypro Sports
   1. Bar shall be designed to provide 18” of vertical adjustment in 6” increments. Unit shall consist of a bar weldment and 2 heavy formed steel channels with wall mounting plates on each end.
   2. The bar weldment shall consist of a 1-1/16” diameter bar x 32” in length with formed braces shall be designed to lock into holes on the wall mounted support channels to provide the adjustment capability. Bar may also be removed from the wall for storage when necessary.
   3. Finish: electrostatic powder coat, color as selected or scheduled.

END OF SECTION 11 6623
SECTION 12 2113- HORIZONTAL LOUVER BLINDS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following types of window treatments and accessories:
   1. Miniblinds with aluminum louver slats.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide Horizontal Louver Blinds, Aluminum Louver Slats by one of the following:
      a. Color: As scheduled
   3. Levolor Contract; a Newell Company; Levolor.
   4. Springs Window Fashions Division, Inc.; Graber.
   5. Verosol USA, Inc.
   6. OEM Shades, Inc.

2.02 HORIZONTAL LOUVER BLINDS, ALUMINUM LOUVER SLATS

A. Louver Slats: Aluminum, alloy and temper recommended by producer for type of use and finish indicated; with crowned profile.
   1. Nominal Slat Width: 1 inch for miniblinds.
      a. Slat Spacing: Every 20 mm for 15.2 slats or more per foot.
   2. Nominal Slat Thickness: Not less than 0.008 inch.
   3. Slat Finish: Ionized coating antistatic, dust-repellent, baked polyester or enamel finish, color as scheduled.

B. Headrail: Formed steel or extruded aluminum; long edges returned or rolled; fully enclosing operating mechanisms on three sides and ends; capacity for one blind per headrail.

C. Bottom Rail: Formed-steel or extruded-aluminum tube, sealed with plastic or metal capped ends top contoured to match crowned shape of louver slat; with enclosed and protected ladders and tapes to prevent their contact with sill.

D. Tilt Control: Consisting of enclosed worm gear mechanism and linkage rod, for the following operation:
   2. Length of Tilt Control: Length required to make operation convenient from floor level.
   3. Tilt: Full.

E. Lift Operation: Manual, cord lock; locks pull cord to stop blind at any position in ascending or descending travel.
F. Ladders: Evenly spaced to prevent long-term louver sag. For Blinds with Nominal Slat Width 1 Inch or Less: Braided string.

G. Mounting: Wall and/or ceiling mounting permitting easy removal and replacement without damaging blind or adjacent surfaces and finishes; with spacers and shims required for blind placement and alignment indicated.
   1. Provide intermediate support brackets if end support spacing exceeds spacing recommended by manufacturer for weight and size of blind.
   2. To hold blind in place, provide both top and bottom support brackets for blinds mounted on any door.

H. Colors, Textures, Patterns, and Gloss: As selected by Architect from manufacturer's full range.

2.03 HORIZONTAL LOUVER BLINDS FABRICATION

A. Product Standard and Description: Comply with AWCMA Document 1029, unless otherwise indicated, for each horizontal louver blind designed to be self-leveling and consisting of louver slats, rails, ladders, tapes, lifting and tilting mechanisms, cord, cord lock, tilt control, and installation hardware.


C. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F:
   1. Blind Units Installed between (Inside) Jambs: Width equal to 1/4 inch per side or 1/2 inch total, plus or minus 1/8 inch, less than jamb-to-jamb dimension of opening in which each blind is installed. Length equal to 1/4 inch, plus or minus 1/8 inch, less than head-to-sill dimension of opening in which each blind is installed.
   2. Blind Units Installed Outside Jambs: Width and length as indicated, with terminations between blinds of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

D. Installation Brackets: Designed for easy removal and reinstallation of blind, for supporting headrail and operating hardware, and for hardware position and blind mounting method indicated.

E. Installation Fasteners: Not fewer than two fasteners per bracket, fabricated from metal noncorrosive to blind hardware and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.

F. Color-Coated Finish:
   1. Metal: For components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

G. Component Color: Provide rails, cords, ladders, and exposed-to-view metal and plastic matching or coordinating with slat color, unless otherwise indicated.

END OF SECTION 12 2113
SECTION 12 2413 - HORIZONTAL ROLLER SHADES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes
   1. Light Filtering roller shades, manually-operated.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide Horizontal Roller Shades by the following:
   1. Basis of Design: Draper, as indicated on Drawing A006

B. Products by other manufacturers will be acceptable only in compliance with the requirements for Product Substitutions and Comparable Products in Division 01 “Product Requirements”.
   1. Hunter Douglass
   2. Springs Window Fashions/Bali
   3. Premier Shades
   4. MechoShade

2.02 HORIZONTAL ROLLER SHADES

A. General: Provide Motorized interior room darkening roller shades with blackout fabric in all exterior windows of rooms and spaces shown on Drawings, and related motor control systems.

B. Shadecloth: Draper, as indicated on Drawing A006.
   1. Color: as scheduled on drawings.

2.03 SHADE BAND

A. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.
   1. Hem Pockets and Hem Weights: Fabric hem pocket with RF-welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be similar, for all shades within one room.
   2. Shade band and Shade Roller Attachment:
      a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection. Roller tubes less than 1.55 inch in diameter for manual shades, and less than 2.55 inches for motorize shades are not acceptable.
      b. Provide for positive mechanical engagement with drive / brake mechanism.
c. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" snap-off" spline mounting, without having to remove shade roller from shade brackets.

d. Mounting spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.

e. Any method of attaching shade band to roller tube that requires the use of: adhesive, adhesive tapes, staples, and/or rivets are not acceptable.

2.04 SHADE FABRICATION

A. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.

B. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch in either direction per 8 feet of shade height due to warp distortion or weave design. Fabricate hem as follows:
   1. Exposed blackout hembar with light seal.

C. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shadecloth within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.

D. For railroaded shadebands, provide seams in railroaded multi-width shadebands as required to meet size requirements and in accordance with seam alignment as acceptable to Architect. Seams shall be properly located. Furnish battens in place of plain seams when the width, height, or weight of the shade exceeds manufacturer's standards. In absence of such standards, assure proper use of seams or battens as required to, and assure the proper tracking of the railroaded multi-width shadebands.

E. Provide battens for railroaded shades when width-to-height (W:H) ratios meet or exceed manufacturer's standards. In absence of manufacturer's standards, be responsible for proper use and placement of battens to assure proper tracking and roll of shadebands.

2.05 COMPONENTS

A. Access and Material Requirements:
   1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
   2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
   3. Use only Delrin engineered plastics by DuPont for all plastic components of shade hardware. Styrene based plastics, and/or polyester, or reinforced polyester will not be acceptable.

B. Motorized Shade Hardware and Shade Brackets:
1. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel, or heavier, thicker, as required to support 150 percent of the full weight of each shade.

2. Provide shade hardware system that allows for field adjustment of motor or replacement of any operable hardware component without requiring removal of brackets, regardless of mounting position (inside, or outside mount).

3. Provide shade hardware system that allows for operation of multiple shade bands offset by a maximum of 8-45 degrees from the motor axis between shade bands (4-22.5 degrees) on each side of the radial line, by a single shade motor (multi-banded shade, subject to manufacturer’s design criteria).

2.06 ACCESSORIES

A. Fascia Electroshades: Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners.
   1. Color: custom color as selected by architect.
   2. Fascia shall be able to be installed across two or more shade bands in one piece.
   3. Fascia shall fully conceal brackets, shade roller and fabric on the tube.
   4. Provide bracket / fascia end caps where mounting conditions expose outside of roller shade brackets.

END OF SECTION 12 2413
SECTION 12 3200 - MANUFACTURED WOOD CASEWORK

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following factory fabricated and field-modified items:
1. Plastic-laminate-faced wood casework of stock and custom design.
2. Hardwood-Veneer wood casework of stock and custom design (Alternate Bid).
4. Resin tops and sinks.
5. Stainless Steel countertops and sinks.
6. Custom fitting and millwork associated with manufactured casework
7. Solid surface transaction counters (reception/charge desks)
8. Solid surface counters with integral sinks (gang toilets)
9. Custom fitting and millwork associated with manufactured casework
10. Miscellaneous furnishings and accessories

B. Related Sections include the following:
1. Division 06 Section "Miscellaneous Rough Carpentry" and Division 09 Section "Gypsum Board Assemblies" for wood blocking and reinforcing for anchoring manufactured casework.
2. Division 06 Section "Architectural Woodwork/Finish Carpentry" for the following:
   a. Decorative resin panel and metal stand-off mounting stud requirements
   b. Solid-surface window stools
3. Division 09 Section "Resilient Wall Base and Accessories" for rubber base applied to manufactured casework.
4. Division 11 Section “Appliances” for freestanding and under-counter appliances installed as part of casework.
5. Division 11 Section “Casework Exhaust Equipment” for spray booths and fume hoods installed with casework.
6. Division 11 Section “Miscellaneous Ed/Admin Equipment” for High-Density Filing System, tagged and scheduled as Casework Equipment KeyNote 18, and for Music Filing System, tagged and scheduled as Casework Equipment KeyNote 19.
7. Divisions 21 through 26 Sections for the following:
   a. Field quality-control testing of mechanical and electrical systems and devices.
   b. Duct connections.
PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Product and Manufacturer limitations:
   1. It is the intent of this specification to establish performance and quality criteria consistent with established standards of design and function herein described. Work not meeting these minimum standards will not be accepted.
   2. Where a product is scheduled or specified, provide the products indicated.
   3. Where a manufacturer is specified, provide products by one of the manufacturers specified.
   4. Subject to compliance with requirements, provide products by a manufacturer allowed under the Product Substitutions provisions of Section 01 6000 Product Requirements.
      a. Specific materials, finish options, construction details, modularity, hardware and test data will be held in strict compliance.

B. Basis-of-Design Manufacturers:
   2. Wood Casework and Tables:
      a. Wood Science Manufactured Casework and Tables: Stevens Industries.
      b. Wood Art Cabinets and Equipment: Shain Solutions.
   3. Plastic-Laminate Material: As scheduled on Drawings (substitutions not accepted).
   4. PVC Edgebanding: Doellken-Woodtape.
   5. Epoxy-Resin Counter and Table Tops: Epoxyn Products.
   6. Wood Tops: Lista International Corp., or as otherwise indicated or approved.
   7. Stainless Steel Countertops: Casework Manufacturer’s Standard.
   8. Solid-Surfacing Material: As scheduled
   10. Miscellaneous Equipment, Components and Accessories: As scheduled or otherwise indicated.

C. Additional Manufacturers: Subject to compliance with requirements and approval by Architect, provide the Basis-of-Design or scheduled products, or comparable products by one of the following:
   1. Manufactured Casework:
      a. Cabinets By Design
      b. Case Systems, Inc.
      c. CampbellRhea
      d. CIF Lab Casework Solutions
      e. Collegedale Casework, LLC
      f. Diversified Woodcrafts.
      g. Hamilton Sorter Company
      h. Kewaunee Scientific Corporation
      i. LSI Corporation of America, Inc.
      j. Mastercraft Woodworking Company, Inc., Shoemakersville, PA
      k. Mott Manufacturing
      l. TMI Systems Design Corporation
      m. Southern Cabinetry Inc., Bidwell, OH.
      n. Thermo Scientific Hamilton
      o. Wood Metal Industries.
3. PVC Edgebanding: Casework Manufacturer’s Standard
4. Solid-Surface Material: Substitutions not accepted
5. Stainless Steel Countertops: Casework Manufacturer’s Standard.
6. Spray Booth: Casework Manufacturer’s Standard
7. Phenolic- and Epoxy-Resin Counter and Table Tops: Casework Manufacturer’s Standard

2.02 MATERIALS

A. General:
1. Maximum Moisture Content for Lumber: 7 percent for hardwood and 12 percent for softwood.
2. Hardwood Plywood: HPVA HP-1, either veneer core or particle core, unless otherwise indicated.
4. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue, made with binder containing no urea formaldehyde or straw-based particleboard complying with ANSI A208.1, Grade M-2 except for density.
6. Hardboard: AHA A135.4, Class 1 Tempered.
7. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3 and “Balanced Construction” and PVA glue applied under rigid, cold press.
8. Edgebanding for Plastic Laminate: Rigid PVC extrusions, through color with satin finish, 3 mm thick at counters, doors and drawer fronts, 1 mm thick elsewhere applied with hot melt adhesive and radiused by automatic trimmers.
10. Edgebanding for Thermoset Decorative Panels: PVC or polyester edge banding complying with LMA EDG-1 and matching thermoset decorative panels.

B. Exposed Cabinet Materials:
2. Wood Species and Veneer Cut: Red oak, plain sliced.
3. Plywood: Sound hardwood plywood with face veneer of species indicated, selected for compatible color and grain and to eliminate appearance defects.
   a. Grade A exposed faces at least 1/50 inch thick, and Grade J crossbands. Provide backs of same species as faces.
4. Solid Wood: Sound clear hardwood lumber, selected to eliminate appearance defects, of species similar in color and grain to exposed hardwood plywood.
5. Glass: Tempered
6. TackBoard: Type II vinyl
7. Unless otherwise indicated, provide specified edgebanding on all exposed edges.

C. Semiexposed Cabinet Materials:
   2. Thermoset Decorative Panels: Approved panel core material with decorative surface of theromally fused, melamine-impregnated web and complying with LMA SAT-1.
      a. Provide melamine-faced panels for semiexposed surfaces, unless otherwise indicated.
   3. Plywood: Hardwood plywood of any species similar in color and grain to exposed wood. Grade B faces and Grade J crossbands. Provide backs of same species as faces.
   4. Solid Wood: Sound hardwood lumber, selected to eliminate appearance defects, of species similar in color and grain to exposed hardwood plywood.
   5. Unless otherwise indicated, provide specified edgebanding on all semiexposed edges.

D. Concealed Cabinet Materials:
   1. Plastic Laminate: Type BKL.
   2. Solid Wood: Any hardwood or softwood species, with no defects affecting strength or utility.
   3. Plywood: Hardwood plywood. Concealed backs of plywood with exposed or semiexposed faces shall be same species as faces.
   4. Particleboard.
   5. MDF.

E. Stainless-Steel Sheet: ASTM A 666, Type 304 with No. 4 satin finish; stretcher-leveled standard of flatness.

F. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.
   1. Integral Sink Bowls: Comply with ISSFA-2 and ANSI Z124.3, Type 5 or Type 6, without a precoated finish.

G. Laminated Safety Glass: ASTM C 1172, Kind LT, Condition A, Type I, Class I, Quality q3 with clear, polyvinyl butyral interlayer.

2.03 SOLID SURFACING MATERIAL

A. Material: Cast, nonporous, Homogeneous solid sheets of filled polymer resin complying with ISSFA-2; not coated, laminated or of composite construction.
   1. Through body colors meeting ANSI Z124.3 and .6, Type Five of Six, and Fed. Spec. WW-541E/GEN.
   2. Nominal sheet thickness: 1/2 inch
   3. Surface burning characteristics in accordance with ASTM E 84: Class I or A, and as follows:
      a. Flame spread: < 25.
      b. Smoke developed: < 25.
   4. Liquid Absorption, ISO 4586-2, for 1/2 inch material thickness: 0.4 percent after 2 hour period.
   5. Izod Impact, ASTM D 256, Method A: 0.3 foot pounds per inch.
   6. Tensile Modulus, ASTM D 638 Nominal: 1.2 million pounds per square inch.
7. Thermal Expansion, ASTM D 696: 0.000018 inch per inch per degree F, maximum.
10. Deflection Temperature under load, ASTM D 648: 90 degrees C.
11. Stain Resistance, ANSI Z-124.3 Modified; 3.4: No effect.
13. High Temperature Resistance, NEMA LD 3-3.06: No effect.
15. Light Resistance, NEMA LD 3-3.03: No effect.
16. Ball Impact Resistance, NEMA LD 3-3.08, one half pound ball, unsupported: 125”.
17. Specific Gravity (Density ASTM D792): 1.60 grams per cubic centimeter.
18. Approximate weight: 4.20 pounds per square foot.

B. Patterns and Finishes: Selected from manufacturer's full range of available selections.

C. Joint adhesive: Manufacturer’s standard adhesive to create inconspicuous, nonporous joints, with a chemical bond.

2.04 DESIGN, COLOR, AND FINISH

A. Provide institutional casework of the following design:
1. Plastic Laminate Casework: Flush overlay with square edges; Plastic laminate tops.
   a. Application: Typical, except as otherwise indicated.
2. Wood Science Casework: Reveal overlay with square edges; Resin Tops of type shown on Drawings.
   a. Application: Alternate Bid.
3. Wood Art Cabinets and Equipment: Reveal overlay with full radius lipped edge
      1) Provide natural maple stain finish
      2) Provide master keyed locks on applicable cabinets
      3) Basis of Design Manufacturer’s construction standards of this product line shall provide the basis for quality and functional installation.
   b. 3/4-inch thick solid maple doors and drawer fronts,
   c. Exposed grain for doors shall run vertical, for drawers horizontal.
   d. Kiln dried lumber tempered to a moisture content of 6% before use, and maintained throughout production.
   e. Material shall be compliant with ANSI/HPVA HP-1 1994 - 3.13 ; 3.15
   f. 3/4-inch White Maple Plywood: 7-ply A-1 Plain Sliced Face Grade Veneers.
      1) Exposed Plywood: Plywood used for exterior surfaces exposed to view after installation, and the exposed interior ends, top and bottom of open cases, or cases having glazed doors, shall have a Maple face, veneer or solid wood core,
      2) Interior Plywood: All interior plywood used in cabinets and cases, unexposed, shall be clear hardwood Grade D veneer face, Grade 3, back. All interior
plywood shall be assembled with PVA glue. All interior unexposed shelves shall be a minimum 7-ply hardwood plywood, minimum 3mm edge banded.

g. High Density Fiberboard: Wood fiber/resinous combination formed with heat and pressure into sheets providing a hard, smooth surface.

h. Sink Supports: Cradle type consisting of two 1-1/2” x 3/4” horizontal cleats and adjustable leveling bolts or glides. The horizontal cleats shall be supported by two 1/8” x 1-1/2” angle irons attached to the cabinet end panels.

i. Shelf Support Clips: Twin pin type for mounting on interior of cabinet work. Clips shall be corrosion resistant and shall retain shelves from accidental removal. Shelves are adjustable on 32mm centers. Surface mounted metal support strips and clips subject to corrosion are not acceptable.

j. Drawer Suspension: Assemblies of two steel epoxy coated sections providing a quiet, smooth operation on nylon rollers, and rated at 100 pounds minimum. Case channels shall maintain alignment of drawer. The drawer shall be removable without the use of tools. Slides shall wrap under drawer sides for additional support.

k. Shop Finish: Basis of Design Manufacturer’s standard of quality, and in compliance with Article 2.06 below, AWI section 1500 and SEFA 8.

B. Tables: Solid hardwood legs, not less than 2 inches square with solid hardwood stretchers as needed to comply with product standard. Bolt stretchers to legs and cross-stretchers, and bolt legs to table aprons. Provide leveling device at bottom of each leg.
   1. Leg Shoes: Black vinyl or rubber, open-bottom, slip-on type.

C. Wood Colors and Finishes: As scheduled or match Architect’s sample.
   1. Grain Direction: Vertical on doors, horizontal on drawer fronts.
   2. Veneer Matching: None required; select and arrange veneers for compatible grain and color.

D. Melamine-Faced Panel Colors, Patterns, and Finishes: As scheduled or otherwise approved by Architect.

E. Plastic-Laminate Colors and Finishes: As scheduled or otherwise approved by Architect.

F. PVC Edgebanding Color: As scheduled or otherwise approved by Architect.

G. Solid-Surfacing Material Colors and Patterns: As scheduled or otherwise approved by Architect.

2.05 FABRICATION, GENERAL

A. General: Fabricate smooth finished condition, free from splits, bruises or other surface irregularities. Millwork construction will not be acceptable.

B. 32 mm System: Side panels constructed with two vertical rows of 8mm holes, precisely 32mm from the center of the next hole. System permits interchangeable components.

C. Wood Finishing: Completed at point of manufacture with furniture and equipment being thoroughly hand and/or machine smoothed and sanded to remove machine or mill marks. After inspection, apply finish system consisting of stain, followed by a sealer coat, then surfaces shall be well sanded before applying catalytic type lacquer or varnish top coat.
D. Metal Finishing: Powder coat metal parts by thoroughly cleaning and electrostatically coating them with an epoxy powder to create a thickness of 2-4 mils and oven cure.

E. Electrical Service Fittings: Provide units complete with metal housings, receptacles, terminals, device plates, accessories, and gaskets required for mounting on casework.
   1. Receptacles: Comply with NEMA WD 1, NEMA WD 6, FS W-C-596, and UL 498. Duplex type, Configuration 5 20R.
      a. Receptacle Grade: General grade, unless otherwise indicated.
      b. GFCI Receptacles: Comply with UL 943, General grade.
   2. Recessed-Type Fittings: Provide with galvanized steel boxes.
   3. Cover Plates: Provide satin finish, chrome-plated cover plates with formed, beveled edges.

F. Filler and Closure Strips and Panels: Provide as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets exposed panels.
   1. Provide utility-space closure panels at spaces between base cabinets where utility space would otherwise be exposed, including spaces below countertops.
   2. Provide closure panels at ends of utility spaces where utility space would otherwise be exposed.
   3. Provide knee-space panels (modesty panels) at spaces between base cabinets, where cabinets are not installed against a wall or where space is not otherwise closed. Fabricate from same material and with same finish as exposed cabinet backs.

2.06 PLASTIC-LAMINATED CABINET FABRICATION

A. Cabinet Construction, comply with referenced AWI quality standard and as follows:
   1. Bottoms and Ends of Cabinets, Shelves, and Tops of Wall Cabinets and Tall Cabinets: 3/4-inch panel, plastic-laminate faced on exposed surfaces, plastic laminate or melamine faced on semiexposed surfaces as indicated.
   2. Backs of Cabinets: 1/2-inch panel, plastic-laminate faced on exposed surfaces, melamine faced on semiexposed surfaces.
      a. Fabricator's option: Provide 1/4-inch hardboard backs, ANSI A 135.4 Tempered, melamine faced on both surfaces. Join to cabinet body with concealed dado, using glue and pressure to assemble. Provide 3/4-in thick lumber anchor strips at top and bottom of wall cabinets, and top of base cabinets.
   3. Drawer Fronts: 3/4-inch panel, plastic-laminate faced on both sides with 3-mm PVC edges.
   4. Drawer Sides and Backs: 3/4-inch thermoset decorative panel, with glued dovetail or multiple-dowel joints.
   5. Drawer Bottoms: 1/4-inch thermoset decorative panel glued and dadoed into front, back, and sides of drawers.
   6. Doors: 3/4-inch panel, plastic-laminate faced on both sides, 3-mm PVC edges.
      a. Panel: Particleboard or MDF with wood stiles and rails.

B. Base Cabinets, Tall Cabinets: For installation on concrete floor deck, fabricate floor-mounted casework for installation over separate continuous wood ladder-type structural cabinet support, with no cabinet body sides extending to floor.
1. Structural Cabinet Support: Cabinet sub-base, separate from cabinet body, and continuous; water resistant exterior grade plywood with concealed fastening to cabinet bottom. Ladder-type construction, of front, back, and intermediates, to form a secure and level platform to which cabinets attach.

2. Sub-base cabinet support at exposed cabinet end panels shall be recessed 1/4 inch from face of finished end, for flush installation of finished base material.

3. Provide 3-mm PVC edge along bottom edge of exposed cabinet end panels.

C. Rubber Base Molding: As specified in Division 09 Section "Resilient Wall Base and Accessories."

2.07 WOOD ART CABINET FABRICATION

A. Cabinet Construction, comply with referenced AWI standard and as follows:


2. Base Cabinet Top Frames: 3/4-by-2-inch solid wood with mortise and tenon or doweled connections, glued and pinned or screwed.

3. Backs of Cabinets: 3/4-inch plywood where exposed, 1/4-inch hardboard or 1/4-inch plywood dadoed into sides, bottoms, and tops where not exposed.

4. Drawer Fronts: 3/4-inch particle-board hardwood plywood or solid hardwood.

5. Drawer Sides and Backs: 3/4-inch solid wood or hardwood plywood, with glued dovetail or multiple-dowel joints.

6. Drawer Bottoms: 1/4-inch hardwood plywood glued and dadoed into front, back, and sides of drawers.

7. Doors: 3/4 inch thick panel with hardwood stiles and rails, hardwood face veneers and crossbands.
   a. Stiles and Rails of Glazed Doors 48 Inches High or Less: 3/4-inch thick, solid hardwood, or particleboard cores and hardwood face veneers and crossbands.
   b. Stiles and Rails of Glazed Doors More Than 48 Inches High: 1-1/16-inch thick, solid wood with hardwood face veneers, or particleboard cores and hardwood face veneers and crossbands.

B. Shop Finish:

1. Chemical-Resistant Finish: Apply wood casework manufacturer's standard two-coat or three-coat, chemical-resistant, transparent finish. Sand and wipe clean between coats. Topcoat may be omitted on concealed surfaces.
   a. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8. Acceptance level for chemical spot test shall be no more than four Level 3 conditions.

2. Preparation: Sand lumber and plywood before assembling. Sand edges of doors and drawer fronts and molded shapes with profile-edge sander. Sand casework after assembling for uniform smoothness at least equivalent to that produced by 220-grit sanding and without machine marks, cross sanding, or other surface blemishes.

3. Staining: Remove fibers and dust and apply wash-coat sealer and stain to exposed and semiexposed surfaces as required to provide uniform color and to match approved samples.
4. Finishing Closed-Grain Woods: Apply two-coat, baked, clear finish consisting of a thermosetting catalyzed sealer and a thermosetting catalyzed conversion varnish.

5. Finishing Open-Grain Woods: Apply three-coat, baked, clear finish consisting of a thermosetting catalyzed sealer and two coats of a thermosetting catalyzed conversion varnish.

2.08 COUNTER AND TABLE TOPS

A. Countertops, General: Provide smooth, clean exposed tops and edges in uniform plane free of defects. Provide front and end overhang of 1 inch over base cabinets.
1. Provide plastic laminate countertops on plastic laminate cabinets
2. Provide solid-surface countertops, sills and transaction surfaces where indicated.
3. Provide epoxy countertops on wood veneer cabinets.
4. Provide stainless steel countertops where indicated.
5. Provide solid-surfacing countertops where indicated.

B. Plastic-Laminate Tops: Plastic-laminate sheet, shop bonded with waterproof glue to both sides of 1-1/8-inch particleboard. At fabricators option, underside of countertops may have thermally fused melamine in lieu of plastic-laminate. Sand surfaces to which plastic laminate is to be bonded.
2. Plastic-Laminate Type for Backing: BKL.
3. All exposed outside corners shall be fabricated with a 1-inch radius with continuous edgebanding
4. Except as otherwise noted, fabricate top and backsplash as separate plastic laminate pieces with 3mm PVC edgebanding at exposed edge. Where indicated, provide separate end splashes fitted to top.
   a. Provide 3-mm PVC edging on front edge of top, on top edges of backsplashes and end splashes, and on ends of tops and splashes.
5. Where countertops are scheduled for freestanding bases, provide 3-mm PVC edging on edges of tops of plastic laminate cabinets; provide specified wood edging on tops of wood cabinets.
6. Use phenolic-resin-bonded particleboard for countertops containing sinks.

C. Solid-Surface Tops: As detailed, homogeneous solid sheets, shop bonded with waterproof glue to particleboard panel, with front edge built up with same material.
1. Fabricate components in shop to greatest extent practical to size and shape indicated, in accordance with approved shop drawing and manufacturer’s published requirements.
2. Form joints between components using manufacturer’s standard joint adhesive. Joints shall be inconspicuous in appearance and without voids. Attach 4-inch-wide solid surface reinforcing strip under joints required by manufacturer.
3. Outside corners shall be smooth radius, no sharp 90 degree corners.
4. Provide holes and cutouts for plumbing accessories.
   a. Use phenolic-resin-bonded particleboard substrate for countertops containing sinks.
5. Rout and finish component edges to a smooth, uniform finish. Rout all cutouts then sand all edges smooth. Repair or reject defective or inaccurate work.
6. Finish: Surfaces shall have a uniform finish.
a. Matte with gloss rating of 5-20.

7. Thermoforming: Comply with forming data from manufacturer.
   a. Construct matching molds to form components shape.
   b. Form pieces to shape prior to seaming and joining.
   c. Cut pieces larger than finished dimensions, sand edges, remove all nicks and scratches.
   d. Heat entire component uniformly between 280°-325°F during forming.
   e. Prevent blistering, whitening or cracking of material during forming.

D. Solid-Surfacing-Material Tops: 1/2-inch-thick, homogeneous solid sheets of filled plastic resin complying with ISSFA-2, standard type, laminated to 1/2-inch plywood or particleboard core, with front edge built up with same material.
   1. Front: 1-inch laminated chamfer.
   2. Backsplashes: 1/2-inch-thick, solid-surfacing material; chamfered at edge.
   3. Integral Sink Bowls: Comply with ISSFA-2 and ANSI Z124.3, Type 5 or Type 6, without a precoated finish.

E. Stainless Steel Tops: Fabricated of 16-ga (0.062-in.) 304-stainless steel sheet and cold-rolled shapes, with integral sinks and splashes, fully welded seams with all joints ground and polished to flush smooth finish. Provide uniform, directionally textured finish with no evidence of welds.
   1. Weld shop-made joints, and grind and polish surfaces to produce uniform, directional, textured, polished finish indicated, free of cross scratches. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
      a. Where field-made joints are required, provide hairline butt-joints mechanically bolted through continuous channels welded to underside at edges of joined ends. Keep field jointing to a minimum.
   2. Where stainless-steel sinks occur in stainless-steel tops, factory weld into one integral unit, grind welds smooth, and polish, passivate, and rinse.
   3. Fabricate stainless-steel sinks with corners rounded and coved to at least a 5/8-inch radius. Slope sink bottoms to outlet. Provide double-wall construction for sink partitions with top edge rounded to at least a 1/2-inch diameter.
   4. Hat channel or wood core construction with undercoating beneath.
   5. Sound deaden undersurface with heavy-build mastic coating.
   6. 4-in high by 1/2-in edge formed integral backsplash and sidesplash with min 1/2-inch return down wall and 3/8" radius cove.
   7. Extend top down to provide a 1-inch-thick edge with a 1/2-inch return flange.
   8. Punch holes for service fittings at factory.
   9. Provide raised marine edge around perimeter of tops containing sinks; pitch two ways to sink to provide drainage without channeling or grooving.
      a. Marine edge, 1 1/4- high, min 1/2-in. return.

F. Adjustable Shelf Supports: Zinc-plated and Powder-coated steel standards and shelf brackets, complying with BHMA A156.9, Types B04102 and B04112, surface mounted.
2.09 CASEWORK HARDWARE and ACCESSORIES

A. Hardware, General: Provide manufacturer's standard satin-finish, and powder-coated, commercial-quality, heavy-duty hardware complying with requirements indicated.
   1. Use threaded metal or plastic inserts with machine screws for fastening to panel core material, except where hardware is through-bolted from back side.

B. Pulls: Satin-nickel solid cast pulls, fastened from back with two screws. Pulls to meet ADA requirements for size and distance from cabinet face. NO wire pulls.
   1. Product: Match pulls on existing casework, as approved by Architect.

C. Drawer Slides: Full-extension ball-bearing, metal-channel, self-closing drawer slides, designed to be mounted on bottom edge of drawer side and to prevent rebound when drawers are closed, complying with BHMA A156.9, Type B05091, and rated for the following loads:
   1. Box Drawer Slides: 120 lbf.
      a. Provide steel ball bearing glides with steel file hangers.
   3. Pencil Drawer Slides: 45 lbf.

D. Butt Hinges: Matte Nickel, semiconcealed, 5-knuckle hinges complying with BHMA A156.9, Grade 1, with antifriction bearings and rounded tips. Provide 2 hinges for doors less than 48 inches high and 3 hinges for doors more than 48 inches high.

E. Door Catches: Heavy-Duty, large-diameter (17.5 mm) Zinc-plated, nylon-roller spring catch. Provide 2 catches on doors more than 48 inches high.

F. Drawer and Cabinet Locks: Deadbolt type, 6-pin tumbler, brass with matte nickel finish, complying with BHMA A156.11, Grade 1.
   1. Key each room separately. Coordinate keying of each room with Owner and Architect prior to fabrication.
   2. Provide a minimum of two keys per lock and six master keys.
   3. Provide locks at all cabinets, doors and drawers, unless otherwise indicated.

G. Sliding-Door Hardware Sets: Manufacturer's standard, to suit type and size of sliding-door units.

H. Adjustable Shelf Supports: 2-pin locking plastic shelf rests complying with BHMA A156.9, Type B04013.

I. Countertop Support: Steel bracket with mounting holes for countertop support at typical casework kneespace.
   1. Basis of Design: Stevens 10840

J. Grommets for Cable Passage through Countertops: 2-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage, color as selected from manufacturer’s standard.
2.10 MISCELLANEOUS EQUIPMENT AND ACCESSORIES

A. Paper Towel Dispenser: As specified in Section 06 4000 or as follows:
   1. Satin finish stainless steel; capacity 300 c-fold or multifold towels; Bobrick Model B-526

B. Wire Management by Doug Mockett & Company, Inc; 800 523 1269; www.mockett.com : As specified in Section 06 4000 or as follows:
   a. One-pc J-shape Wire Manager: WM2-90; Color Black (as detailed)

C. Plastic Trash Cabinet Liner: 15 gallon rigid plastic container:
   1. Rubbermaid 6245

D. Cash Drawer Money Tray: 5-coin/ 5 bill ABS black plastic tray, 16 in W x 10.9 in L x 2.2 in H
   1. Semicron Systems Model 73041-003-STD

2.11 WALL SHELVING

A. Plastic-Laminate Shelving: Plastic-laminate sheet, Type HGL or HGP, shop bonded with waterproof glue to both sides of 3/4-inch particleboard or medium-density fiberboard, plywood or engineered board. Sand surfaces to which plastic laminate is to be bonded.
   1. Shelf Thickness: 3/4 inch unless otherwise indicated.
   2. Edge Treatment: Finish both edges with rigid PVC extrusions, through color with satin finish, 3 mm thick.

B. Adjustable Shelf Supports: Zinc-plated or Powder-coated steel standards and shelf brackets, complying with BHMA A156.9, Types B04102 and B04112, surface mounted.

END OF SECTION 12 3200
SECTION 12 5651 - LIBRARY FURNITURE AND EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes items scheduled on the “Library Equipment Schedule” on the Drawings, and as follows:
   1. Modular Wood Library Shelving.
   2. Custom Modifications to Stock Design Units.

B. Related Sections include the following:
   1. Division 06 Section "Miscellaneous Rough Carpentry" for wood blocking for anchoring fixed work.
   2. Division 06 Section "Architectural Woodwork" for the following:
      a. Custom woodwork and trim.
   3. Division 09 Section "Gypsum Board Assemblies" for reinforcements in gypsum board partitions for anchoring fixed work.
   4. Division 12 Section "Manufactured Wood Casework" for the following:
      a. Stock and Custom casework, including charge desk.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis-of-Design Products: The design for the library equipment is based on products by manufacturers named below and scheduled on Drawing.

B. Subject to compliance with requirements, provide either the named product or accepted product substantially similar in visual appearance, quality and construction by one of the manufacturers listed below, as appropriate.
   1. Match scheduled Basis-of-Design products to Architect’s satisfaction. Specified appearance, materials, finish options, construction details, modularity, hardware, warranty and test data will be held in strict compliance.
   2. Acceptable manufacturers, proposed substitute products, systems and assemblies, subject to acceptance by Architect.
      a. Blanton & Moore, 412 630 9166
      c. Doug Mockett & Company, Inc, 800 523 1269; www.mockett.com
      e. Library Bureau, 1-800-221-6638.
      f. Media Technologies
      g. Russell Carroll Manufacturing, 412-835-7772.
      h. Tesco
      i. Wood Metal Industries.
      j. Worden Company, 1-800-748-0561; www.wordencompany.com
2.02 MATERIALS

A. Lumber: Northern grown hardwoods, properly air dried and kiln dried to a final 6 to 8 percent moisture content. Lumber is stress relieved and then cooled and allowed to equalize throughout manufacture to be certain the finished furniture has the same 6 to 8 percent moisture content.

B. Exposed Wood Species: Hardwood species as indicated on Drawings, free of detrimental defects and selected for uniform grain and color. Solid woods may reflect some inherent variations in color and grain.
   1. Staining and finish, as scheduled, to match approved sample.

C. Face and Exposed Veneers: HPVA HP-1, with face veneer of species indicated on Drawings, with Grade A faces
   1. Plain sliced hardwood not less than 1/34-inch-thick. Veneer is to be tight and smooth cut, matched with tight side up, selected for uniformity, even grain, beauty and color. Face veneers are to be free of any splits, patches or other detrimental defects.
   2. Veneers are to be matched to prevent lap or open joints. Tape is not permitted on glue lines. The bonding agent is to have same water resistance as bonding specified in lumber core manufacture.
   3. Unexposed Veneers: Same species as face but not selected for color or grain.

D. High Pressure Laminate: For work surfaces, .050-inch thick laminates with a backing sheet not less than .050 thickness for balance. High pressure laminates consist of layers of melamine and fibrous sheet material, impregnated with a thermosetting condensation resin, all consolidated under heat and pressure.
   1. Vertical Laminate Components: 1/32-inch thick on both surfaces.
   2. Solid color and wood grain laminates comply with NEMA LD-3 performance standards and have a low sheen value not to exceed 15 as measured for "Furniture Finish".

E. Multi-ply Core: Veneer core plywood to be constructed with an odd numbers of plies with interior plies, except core or center ply occur in pairs. Two plies of each interior pair are of the same species, thickness, and grain directions and placed on opposite sides of the core. Plies are to be free from blisters, wrinkles, laps or other defects.

F. Lumber Core - 5-Ply: Good grade core stock of controlled width to minimize any tendency to warp. Discoloration, sound knots and open defects if securely patched or filled, and butt joints other than at the edges are permitted. Brashness and doze are not permitted.
   1. Fabrication: 5-ply construction consists of lumber core, 2 crossbands running in opposite direction of the grain of the core, and a face and a back veneer or high pressure laminate running parallel to the core. Crossband veneers are to be no less than 1/28-inch thick.
   2. Exposed edges to be banded with solid hardwood to match exposed finishes.

G. Bonding Agent For Core Construction: Water resistant resin adhesive which will retain practically all its strength when occasionally subjected to a thorough wetting and drying. Bond to be of a quality that test samples will withstand an average of ten (10) cycles when subjected to the fifteen (15) cycle soak test.

H. Hardware: Exposed face hardware is cast bronze with a brushed finish. Other hardware is manufacturer’s standard or as detailed in the individual equipment series specifications.
2.03  FABRICATION, GENERAL

A.  General: Fabricate smooth finished condition, free from splits, bruises or other surface irregularities. Millwork construction will not be acceptable.

B.  32 mm System: Side panels constructed with two vertical rows of 8mm holes, precisely 32mm from the center of the next hole. System permits interchangeable components.

C.  Joinery: Mortise and tenon, glued wood splines or dowels, wood screws (plugged where exposed) dovetails, wedge tenon and lock corner joints. The use of a specific joint will be dictated by its end use requirement for maximum joint strength in each condition. All work to be securely glued and blocked.

D.  Plastic Laminate: Meet countertop requirements specified under Division 06 Section “Architectural Woodwork” for horizontal surfaces indicated as plastic laminate.

E.  Wood Finishing: Completed at point of manufacture with furniture and equipment being thoroughly hand and/or machine smoothed and sanded to remove machine or mill marks. After inspection, apply finish system consisting of stain, followed by a sealer coat, then surfaces shall be well sanded before applying catalytic type lacquer or varnish top coat.

F.  Metal Finishing: Powder coat metal parts by thoroughly cleaning and electrostatically coating them with an epoxy powder to create a thickness of 2-4 mils and oven cure.

G.  Colors for wood and high pressure laminates are to be as scheduled or otherwise approved by Architect. Wood stain colors to be as scheduled custom mixed to match existing finishes, subject to Architect's approval. Exposed surfaces to be free of orange peeling.

2.04  SHELVING UNITS

A.  General: Shelving unit construction consists of starter sections and adder sections that are nominal 36-inches from center to center of uprights. A starter section has as its component parts, one pair of finished end panels, a top, a base and the requisite number of adjustable shelves. Additional sections have an intermediate upright, a top, a base and a requisite number of adjustable shelves. Additional sections have an intermediate upright, a top, a base and the requisite number of adjustable shelves.

1.  No particleboard is to be used in the construction of wood book shelving.

B.  European 32mm System: Side panels of all wood shelving units constructed with two vertical rows of 8mm holes, precisely 32mm from the center of the next hole.

C.  End Panels: 1-inch-thick five ply lumber core or veneer core plywood with cross-band of 1/28-inch thick hardwood and a 1/34-inch thick face veneer. Edges are bound with a 1/8-inch thick solid hardwood binder. Binder is on long edges and top of 60-1/2-inches high, 42-inches high panels, 30-inches high panels and 16-inches high panels and on long edges of panels 82-inches high. End panels are drilled with shelf pin adjustment holes on inside faces to provide shelf adjustment 32mm on centers.

D.  Intermediate Uprights: 1-inch-thick five ply lumber core or veneer core plywood or 3/4-inch thick solid hardwood, shelf pin adjustment holes are bored on both faces of intermediate uprights, 32mm on centers. Opposite rows are offset so holes do not coincide and weaken the upright. Connecting holes are bored for top and base connection.
E. Base Assembly: 4-inches high solid hardwood front securely glued to a hardwood block frame. The frame has drilled glue blocks on each end for joining to metal bushings in end panels or through intermediate uprights. Each base assembly accommodates one flat base shelf. Single-faced sections receive one base assembly. Two base assemblies for each double-faced unit.

F. Top Assembly: Single or double faced of veneer core construction with selected plastic laminate veneer. Single faced tops have one glue block at each end with two holes for connection to metal bushings in end panels or through intermediate uprights. Double faced tops are one piece construction and plastic laminate finish.

G. Continuous Top: Provide custom plastic laminate tops as indicated and detailed on Drawings, for field installation on assembled shelving units.
   1. Conform to specified requirements for countertops in Division 06 Section “Architectural Woodwork.”

H. Wood Shelves: Panels consisting of solid hardwood boards glued together, 3/4 inch thick, or veneer panels, 1 inch thick, with 1/4-inch solid-wood banding, and grooved on underside to rest securely on supporting pins.

I. Finished Wood Backs: 1/4-inch thick, 5-ply construction, consisting of core stock and each face with 1/34-inches thick hardwood veneer.

2.05 METAL FINISHES, GENERAL

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

2.06 ALUMINUM FINISHES

A. Baked-Enamel Finish: Apply manufacturer's standard baked-enamel finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness; in standard neutral color.

2.07 STEEL FINISHES

A. Baked-Enamel Finish: Apply manufacturer's standard baked-enamel finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness; in standard neutral color.
   1. Automatically wash and phosphate coat metal surfaces.
   2. Following complete drying process, each part is to receive a finish coat of high solids polyester blend baked enamel powder coat.

END OF SECTION 12 5651
SECTION 12 6600 - TELESCOPING BLEACHER SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following: Wall-attached, integral power operating telescoping bleacher system for use in Gymnasium and LGI

B. Related Sections

1. Division 09 Sections for installation of the required flooring systems
2. Division 26 Sections for electrical service and connections including metal device boxes for switches and conduit, where required, control wiring.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Systems:

1. **Basis of Design:** Interkal – Telescoping closed deck gymnasium bleacher system with 10-in CSM contoured seat modules, Vari-Row recoverable ADA locations, Wide Track power system, Fold-Down center aisle rails.


3. Irwin – Model 4500 with 10-in plastic seat modules, MDU recoverable ADA locations, power frame power system, Fold-Down center aisle rails and 3/4-in decking thickness.

B. Naming or approval of a manufacturer as acceptable does not indicate that a manufacturer’s standard products will be acceptable. All manufacturers must meet the minimum standards of quality specified herein.

2.02 MATERIALS


B. Plywood: Softwood plywood panels, 5/8-inch nominal thickness, 5-ply construction with grade designation American Plywood Association (APA) A-C Exterior, with solid crossbands, Group 1 veneer species for plies, and exterior glue, APA grade trademarked, complying with DOC PS 1 requirements, unless otherwise noted.

C. Structural Steel Shapes, Plates, and Bars: ASTM A 36, except where higher strength steel is indicated or standard with manufacturer.
D. Commercial-Quality Uncoated Steel Strip (Non-Structural Components): ASTM A 569 Hot-rolled strip.

E. Structural-Quality Uncoated Steel Strip (Structural Components): ASTM A 570 Grade 33, 40, 45 or 50, or hot-rolled steel strip.

F. High-Strength Uncoated Steel Strip (Structural Components): ASTM A 607 hot- or cold-rolled steel sheet, stretcher leveled.

G. Structural-Quality Galvanized Steel Strip: ASTM A 653, G60 coating designation zinc coated by hot-dip process, phosphatized, stretcher leveled.

H. Steel Tubing: ASTM A 500, cold formed; or ASTM A 501, hot formed.

I. Polyethylene Plastic: ASTM D 1248, Type III, Class B; molded, color-pigmented, textured, impact-resistant, structural formulation.

J. Fasteners: Vibration proof, of size and material standard with manufacturer.

K. Letters and Numbers: Oval etched LEXAN plates with easy to read black numerals.

2.03 COMPONENTS

A. General: Provide telescopic bleacher system fabricated to comply with requirements indicated. Smoothly round corners, edges and exposed fasteners to eliminate snagging and pinching hazards. Form exposed sheet metal with flat, flush surfaces, true to line and level, and without cracking and grain separation. Perform welding by operators and processes complying with AWS requirements.

1. Row Spacing: as indicated on Drawings.

2. Row Rise: as indicated on Drawings.

3. Seating Capacity: as indicated on Drawings

4. Accessibility Features
   a. Truncations: One full section truncation, one row deep, with necessary closure panels and portable step assemblies at aisles as required by authority having jurisdiction.

5. Pendant Control: Dual directional, removable walk along pendant control plugged into a single receptacle.
   a. Locate 24 VAC receptacle behind the first row kickboard, coordinated to give the operator proper position for visual control.

B. Seat Module:

1. Ergonomically contoured “waterfall” forward edge for enhanced spectator comfort.

2. Provide a 21-1/2” clear foot space area, regardless of leg positioning.

3. 18-inch wide one-piece individual seating modules, 10 inches deep, constructed of high-density polyethylene.

4. Each module shall have a full interlock to the adjacent module both around the perimeter and along the internal ribs to eliminate pinching hazards and assure proper alignment.

5. Rigid steel-to-steel attachment of each module to a galvanized steel nosebeam, with concealed mounting hardware.
6. End caps at each aisle.

7. Each module shall have a recessed area for seat numbering.

8. Color as selected by Architect from manufacturer's standard range.

C. Frame System:
1. General: Form exposed sheet metal with flat, flush surfaces, true to line and level, and without cracking and grain separation. All welding shall be performed by operators and processes complying with AWS requirements. Corners, edges and exposed fasteners, if any, shall be smoothly rounded to eliminate snagging and pinching hazards.

2. Wheels: Not less than 4” diameter by 1 1/4” with non-marring soft rubber face to protect wood and synthetic floor surfaces and to minimize rolling resistance, with molded-in sintered iron oil impregnated bushings to fit 3/8” diameter axles secured with E-type snap rings.

3. Lower Track: Continuous Positive Interglide system interlocks with each adjacent CPI and frame unit using an integral continuous, anti-drift of a minimum length of 20" per row to prevent separation and misalignment. Each CPI unit shall contain a Low Profile Posi-Lock LX to lock each row in open position and allow unlocking automatically. Provide adjustable stops to allow field adjustment of row spacing.

4. Slant Columns: Steel, tubular shape – minimum two per row per section.

5. Diagonal Sway Bracing: Steel members with all edges radiused and smoothed, through-bolted to columns -galvanized.


7. Deck Stabilizer: Incorporate top interlocks securely capturing decking for entire length of section to maintain alignment and support.

D. Deck System:
1. Section Lengths: Each bank shall contain section lengths as indicated on the drawings with a minimum of two support columns per row, each section.

2. Nosing and Rear Riser: Continuous roll formed galvanized steel members. Both shall continuously support and enclose both front and rear edges of decking and provide additional foot room by their design.

3. Attachment: Through-bolted fore/aft to deck stabilizers and frame cantilevers.

4. Decking: Shall be 5/8”, AC grade, tongue and groove, transversely oriented plywood, interior type with exterior glue, 5 ply, all plies Southern Pine, to eliminate splintering with plugged cross-bands, produced in accordance with National Bureau of Standards PS-1-83. Longest unsupported span shall be 21-1/2 inches.

5. Deck End Overhang: Not to exceed frame support by more than 5’-7”.

E. Accessories:
1. Wheelchair Seating: Recoverable Truncations; Provide full section recoverable handicap seating as shown on architectural drawings. Include portable step assemblies at affected aisle locations. Recoverable truncations to be one row deep.
2. Foot Level Aisles: Provide deck level, full width vertical aisles located as indicated and dictated by code.

3. Front Aisle Steps: Provide at each vertical aisle location. Front steps shall engage with front row to prevent separation or movement. Steps shall be fitted with four non-skid rubber feet.

4. Intermediate Aisle Steps: Provide at each vertical aisle location. Intermediate aisle steps shall be of boxed fully enclosed type construction. Blow molded end caps shall have full radius on all four edges. Steps shall have non-skid on surface.

5. Non-Slip Treads: Provide at front edge, adhesive-backed abrasive non-slip tread surface, for each tier at aisle locations.

6. Intermediate Aisle Handrails: Comply with code requirements
   a. Single pedestal mount handrails, 34” high, which mount to the deck surface immediately in front of the intermediate aisle step.
   b. Handrails shall start at first row, lock into the socket and easily lock and unlock, lift and rotate 90 degrees sliding through bracket for easy horizontal storage in the aisle area behind deck nosing without separation or use of tools.
   c. Aisle handrails that require removal for storage are not acceptable.

7. Self-Storing End Rails: Provide steel self storing end rails, 42” high above seat, with tubular supports and intermediate members to comply with all code requirements. Rails shall be fitted to each exposed bank end from second row and above with all steel to steel connections. Finish shall be a polyester powder coat.

8. Self-Storing Vinyl End Closures: Provide at all exposed bleacher ends, solid polyester reinforced vinyl 14 ounce per square yard, fungi resistant, flame retardant material meeting NFPA Test 701-2 and Federal Flame Retardant Standards in color as selected by the Architect. All seams to be electrically welded with a 1 9/16" full contact weld. Material shall have metal grommets in locations as required for proper support and ease of operation. Install at all exposed open ends of bleacher seating, complete with all required anchors, attachment plates, cables and other necessary hardware.

9. Rear Closure Board: Provide and install a properly supported, flush mounted board between the last row of the bleacher and the wall.

10. Numbering: Provide seat numbers and row letters for sculpture seat modules. Sequence to be determined by Architect or Owner.

2.04 METAL FINISHES

A. Surface Preparation: Solvent-clean surfaces to comply with SSPC-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel complying with SSPC-SP 5 (White Metal Blast Cleaning) or SSPC-SP 8 (Pickling).

B. Rust-Inhibitive Finish: Immediately after cleaning and pretreating, apply Dura-Coat enamel rust-inhibitive with silicone additive finish to exposed and concealed metal surfaces including understructure, except where other types of finishes are indicated.

1. Alkyd Enamel Finish: Finish system consisting of prime coat and topcoat.

C. Understructure: Understructure finish shall contain a silicone additive to improve scratch resistance of finish.
D. Wear Surfaces: Surfaces subject to normal wear by spectators shall have a finish that does not wear to show different color underneath:
   1. Steel Nosing, Rear Risers and Diagonal Bracing: Shall be pre-galvanized with a minimum spangle of G-60 zinc plating.
   2. Decking: Shall have all surfaces to receive a sealer coat with use surfaces to receive a high gloss clear urethane finish.
   3. Contoured Seating: Colors as scheduled and detailed.
   4. Railings: Shall be finished with powder coat semi-gloss black.

2.05 WOOD FINISHES

A. Transparent Finish: Prepare surfaces by machine sanding, supplemented by hand sanding where required, followed by application of sealer coats and transparent topcoats of type, in number, and by process specified. Apply to plywood surfaces.

2.06 OPERATION

A. General: Provide bleacher units incorporating telescoping system of seating and understructure members which permit opening and closing with respect to adjacent rows, which allow any or all rows to be locked open for use, and which close with vertical faces in same vertical plane.

B. Integral Powered Frame: Provide integral automatic electro-mechanical propulsion system, to open and close telescopic seating. Integral Power and Control System shall be Underwriters Laboratories, Inc. (UL) approved and listed.

C. Operation: Shall be with a removable pendant control unit which plugs into seating bank for operator management of stop, start, forward and reverse control of the power operation with a three-position spring-loaded rocker switch.

D. Operating Loads: Each powered frame provides 220 pounds pull force, which equals approximately 35 pounds per square inch of lateral force on the floor.

E. Limit Switches: Provide both open and closed limit switches for the integral power system. The limit switches will automatically stop integral power operation when seating has reached the fully extended or closed positions, for protection of both the bleacher power systems and the facility flooring systems. All power systems will incorporate limit switches.

F. Electrical:
   1. Seating Manufacturer: Shall provide all wiring within seating bank including pendant control. Each section shall be operated by 1/2 horsepower, 1725 RPM, 208 Volts, 50/60 Hz, three phase 1.25 service factor motor(s). This motor draws a full load current of 2.2 amperes. Power supply required shall be 120/208 Volts three phase 4 wire plus ground service with 20 amps. Motors, housing and wiring shall be installed and grounded in complete accord with the National Electric Code. Internal bleacher power wiring system shall provide for the system to be “safe” or “dead” until activated, minimizing the danger of shock.
   2. Electrical Contractor: Shall provide required power source at the locations coordinated with the bleacher manufacturer with no greater than 4% voltage drop from the panel at the seating
junction box. The Electrical Contractor shall perform all wiring connections, provide and install junction box and manual non-fused disconnect which are a part of the building electrical system associated with bleacher power and install and wire contactors provided as part of the telescopic bleachers.

END OF SECTION 12 6600
SECTION 12 6623 - TELESCOPING AUDIENCE SEATING (LGI ALTERNATE BID)

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

A. Wall-attached Tapered Telescoping Platforms
   1. Operable systems of multiple-tiered interconnected, folding supports with semi-automatic folding seats with backs which permit closing, without requiring dismantling, into a nested relationship for purposes of storing.
   2. Use installation methods and fasteners that produce fixed audience seating assemblies with individual chairs capable of supporting an evenly distributed 600-lb static load without failure or other conditions that might impair the chair's usefulness.

B. Application: LGI – Alternate Bide

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

A. Basis of Design Manufacturer:
   Hussey Seating Company
   1. Model: MAXAM – MXM PLUS having Metro Chairs with Upholstered Seats and Backs, Carpeted Decks, and Powered Frame power system.

B. Other Acceptable Manufacturers:
   Subject to compliance with the specific requirements contained herein, manufacturers offering products that may be incorporated into the work include the following:
   1. Interkal – VIP closed deck platform with PC Chairs, Wide Track power system, and Fold-Down center aisle rails.
   2. Irwin – Model 4500 with Quest Chairs, Power Frame power system, and Fold-Down center aisle rails.

C. Naming or approval of a manufacturer as acceptable does not indicate that a manufacturer’s standard products will be acceptable. All manufacturers must meet the minimum standards of quality specified herein.

2.02 MATERIALS


B. Plywood: ANSI/Voluntary Product PS1, APA A-C Exterior Grade.

C. Structural Steel Shapes, Plates and Bars: ASTM A 36.
D. Uncoated Steel Strip (Non-Structural Components): ASTM A569, Commercial Quality, Hot-Rolled Strip.
E. Uncoated Steel Strip (Structural Components): ASTM A570 Grade 33, 40, 45 or 50, Structural Quality, Hot-Rolled Strip.
F. Uncoated Steel Strip (Structural Components): ASTM A607 Grade 45 or 50, High-Strength, Low Alloy, Hot-Rolled Strip.
G. Galvanized Steel Strip: ASTM A653 Grade 40, zinc coated by the hot-dip process, Structural Quality.
H. Structural Tubing: ASTM A500 Grade B, cold-formed.
I. Polyethylene Plastic: ASTM D 1248, Type III, Class B, molded, color-pigmented, textured, impact-resistant, structural formulation; in color indicated or, if not otherwise indicated, as selected by Architect from manufacturer’s standard colors.
J. Fasteners: Vibration-resistant with locking nut or washer.

2.03 MANUFACTURED UNITS
A. General: Provide telescopic platform system fabricated to comply with requirements indicated. Smoothly round corners, edges and exposed fasteners to eliminate snagging and pinching hazards. Form exposed sheet metal with flat, flush surfaces, true to line and level, and without cracking and grain separation. Perform welding by operators and processes complying with AWS requirements.
B. Chair System: Beam-mounted design, consisting of chairs independently mounted and armrests independently mounted to transverse beam. Top of support arms shall be designed to capture and secure the beam in place. Support arms articulate from semi-automatic operating mechanism.
   1. Row Spacing: 30 inches
   2. Row Rise: 11 5/8 inches
C. Semi-Automatic Operation: Rows of chairs shall be manually raised or lowered as one unit with spring-counter-balance to offset weight. Semi-Automatic operation will require depressing a foot pedal to activate the unlocking system to lower each row of spring-counter-balanced chairs. Unlocking shall be performed from an aisle.
D. Seat Support:
   1. Each of the independent seat hinges shall be fitted with up and down stops as well as double-acting, self-centering, preloaded coiled seat return springs with silencers.
   2. Chairs must be designed with two independent return springs which position seat pan in 3/4 fold position with 100 percent fold position available for added aisle passage. Seat action shall be dampened for a constant velocity return and no final oscillations to the rest position.
   3. Hinges, seat support, return springs, and stops shall be enveloped and concealed by the seat and back shells. Seat shall have the ability to achieve a full fold position when rearward pressure is applied. Superior comfort shall be derived through careful ergonomic engineering.
E. Upholstered Seats / Backs:
1. Each seat and back shall be textured one-piece gas-assist injection molded pigmented polypropylene shells.
2. Upholstery shall be a complete self-retaining unit, welded to the seat and back surfaces using a hot plate welding technique.
3. Each unitized upholstery panel shall be comprised of medium density virgin urethane foam on a precision injection molded polypropylene backer. Seat foam shall be 1-1/2” thick. Back foam shall be 1” thick. The fabric cover shall be tensioned over and neatly enclose both foam and backer. Seat covers shall be three-piece construction.
4. Each seat and back shall be internal structured with peripheral gas channel frame. The frames shall support, resist, and transmit design loads to the aluminum chair beam.

F. Seat Shell/Bottom: Polypropylene plastic to provide a durable yet aesthetic design. The cover shall protect the mechanical parts of the lifting hinge and upholstered cover. The shell / bottom shall compliment the overall design of the chair.

G. Armrests: Injection-molded, leather textured polypropylene secured to polypropylene armrest base with concealed fasteners. Armrest standard to be of powder-coated cast aluminum grade AA 380 and independently secured to mounting beam.

H. Chair Beam: Extruded aluminum with polymer end caps. Beam shall serve as the focal attachment and shall in turn transmit all forces to the beam support.

I. Beam Support: Cast steel support arms. Closed seam steel tube standards are unacceptable. Top of support arms shall be designed to capture and secure the beam in place. Support arms articulate from manual assist or semi-automatic operating mechanism.

J. Frame System:
1. Wheels: Not less than 5-in diameter by 1 1/4-in with non-marring soft rubber face to protect wood and synthetic floor surfaces and to minimize rolling resistance, with molded-in sintered iron oil impregnated bushings to fit 3/8” diameter axles secured with E-type snap rings.
2. Lower Track: Continuous Positive Inter-glide system interlocks with each adjacent CPI and frame unit using an integral continuous, anti-drift of a minimum length of 20 inches per row to prevent separation and misalignment. Each CPI unit shall contain a Low Profile Posi-Lock LX to lock each row in open position and allow unlocking automatically. Provide adjustable stops to allow field adjustment of row spacing.
4. Diagonal Sway Bracing: Steel members through-bolted to columns-galvanized.

K. Deck System:
1. Section Lengths: Each bank shall contain section lengths as indicated on the Drawings with a minimum of two support columns per row for each section.
2. Nosing and Rear Riser: Continuous roll formed galvanized steel members.
3. Attachment: Through-bolted fore/aft to deck stabilizers and frame cantilevers.
4. Decking: 3/4-in. AC grade, tongue and groove, transversely oriented plywood, interior type with exterior glue, 5 ply, all plies Southern Pine, to eliminate splintering with plugged cross-bands, produced in accordance with National Bureau of Standards PS-1-83. Longest unsupported span shall be 28 1/2 inches.
5. Deck End Overhang: Not to exceed frame support by more than 5 ft-7 in.

L. Accessories:
1. Foot Level Aisles: Provide deck level, full width vertical aisles located as indicated on the Drawings.
2. Front Aisle Steps: Provide at each vertical aisle location. Front steps shall engage with front row to prevent separation or movement. Steps shall be fitted with four non-skid rubber feet.
3. Intermediate Aisle Steps: Provide at each vertical aisle location. Intermediate aisle steps shall be of boxed fully enclosed type construction. Blow molded end caps shall have full radius on all four edges. Steps shall have non-skid on surface and be additionally sound deadened.
4. Non-Slip Treads: Provide at front edge, adhesive-backed abrasive non-slip tread surface, for each tier at aisle locations.
5. Intermediate Aisle Handrails: Provide single pedestal mount handrails, 34” high with terminating mid rail, which mount to the deck surface in front of the intermediate aisle step. Handrails shall lock into the socket and shall lift and rotate 90 degrees for easy storage within the deck area. Aisle handrails that must be removed from the socket for storage, or that protrude from the deck nosing into the play area causing a safety hazard when the bleacher unit is stored, are unacceptable.
6. Self-Storing End Rails: Provide steel self storing end rails, 42” high above seat, with tubular supports and intermediate members designed with 4” sphere passage requirements to, and including, the second row or tier.
7. Self-Storing Vinyl End Closures: Provide at all exposed bleacher ends, solid polyester reinforced vinyl 14 ounce per square yard, fungi resistant, flame retardant material meeting NFPA Test 701-2 and Federal Flame Retardant Standards in color as selected by the Architect. All seams to be electrically welded with a 1 9/16" full contact weld. Material shall have metal grommets in locations as required for proper support and ease of operation. Install at all exposed open ends of bleacher seating, complete with all required anchors, attachment plates, cables and other necessary hardware.
8. Carpeted Decks: Provide at decks and steps double tufted, anti-static, solid and crush resistant 100% polypropylene pile with high density foam backing carpet. Color to be chosen of manufacturer's standard selection offering.
9. Chair Numbers: Black text with gray background on a nom. 3/4-in x 2 1/4-in Lexan plate. Plate fitted in a vandal resistant recess located in rear of armrest and secured with adhesive.
10. Row Letters: Black text with gray background on a nom. 3/4-in x 2 1/4-in Lexan plate. Plate fitted in a vandal resistant recess located in rear of armrest and secured with adhesive.

2.04 FINISHES
A. Understructure: For rust resistance, steel understructure shall be finished on all surfaces with black “Dura-Coat” enamel. Understructure finish shall contain a silicone additive to improve scratch resistance of finish.

B. Wear Surfaces: Surfaces subject to normal wear by spectators shall have a finish that does not wear to show different color underneath:
1. Steel Nosing, Rear Risers and Diagonal Bracing: Shall be pre-galvanized with a minimum spangle of G-60 zinc plating.
2. Decking: Shall have all surfaces to receive a sealer coat with use surfaces to receive carpet as specified under Accessories.
3. Injection Molded Seats: Shall be selected from fifteen standard colors.
4. Railings: Shall be finished with powder coat semi-gloss black.

C. Chair Components:
1. Steel / Aluminum Components: Material shall be pre-treated in an iron phosphate wash system prior to finish application. Finish shall be a specially blended polyester T.G.I.C./Epoxy powder coating with a minimum dry film thickness of 1.5 mils.
2. Injection Molded Polypropylene or Nylon: Shall be pigmented, in one of manufacturers standard colors and have a textured surface.
3. Fabric: as scheduled on Drawings
4. Color: Shall be selected by Architect from Manufacturer’s range of standards, from a minimum of fifteen offerings.

2.05 OPERATION:

A. Integral Power: Provide Hussey Powered Frame integral power system, an integral, automatic electro-mechanical propulsion system, to open and close telescopic seating. Integral Power and Control System shall be Underwriters Laboratories, Inc. (UL) approved and listed. Friction power systems with tractors mounted under the first row decks, and non-friction type power systems, are unacceptable.

1. Operation: Shall be with a removable pendant control unit which plugs into seating bank for operator management of stop, start, forward and reverse control of the power operation with simple three position spring-loaded rocker switch.
2. Powered Frames: Shall consist of an output shaft gear reducer with 6” diameter x 4” wide wheels covered with non-marring ½” thick composite rubber. Reducers shall be fitted with induction motors that will provide an average operating speed of 25 feet per minute. Provide a minimum of two 4” drive wheels per section.
3. Operating Loads: Each powered frame provides 550 pounds pull force, which equals approximately 35 pounds per square inch of lateral force on the floor.
4. Limit Switches: Provide both open and closed limit switches for the integral power system. The limit switches will automatically stop integral power operation when seating has reached the fully extended or closed positions, for protection of both the bleacher power systems and the facility flooring systems. Power systems that do not incorporate limit switches are unacceptable.
5. Electrical:
   a. Seating Manufacturer: Shall provide all wiring within seating bank including pendant control. Each section shall be operated by 1/2 horsepower, 1725 RPM, 208 Volts, 50/60 Hz, three phase 1.25 service factor motor(s). This motor draws a full load current of 2.2 amperes. Power supply required shall be 120/208 Volts three phase 4 wire plus ground service with 20 amps. Motors, housing and wiring shall be installed and grounded in complete accord with the National Electric Code. Internal bleacher power wiring system shall provide for the system to be “safe” or “dead” until activated, utilizing a combination of contactors and limit switches to insure wiring is not energized except during operation minimizing the danger of shock.
   b. Electrical Contractor: Shall provide required power source, with no greater than 4% voltage drop from the panel, at the seating junction box. The Electrical Contractor shall perform all wiring connections, including contactors, and provide and install junction box and manual disconnect which are a part of the building electrical system associated with bleacher power.

END OF SECTION 12 6623
SECTION 14 2823 – PASSENGER ELEVATOR MODIFICATIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes: Modernization at existing passenger elevator

B. Modernization work includes limited upgrades to existing systems, finishes and components, compatible with systems and components to remain:
   1. Control System
   2. Operating Panels
   3. Accessibility provisions.

C. Required hoisting, permits and coordination and approvals with local jurisdictions and the Commonwealth of Pennsylvania.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Only products and components produced or provided by manufacturers regularly engaged in the manufacture of elevator products, and that comply with ASME A17.1 in its entirety, ASME A17.2, prevailing PA codes, and additional requirements specified herein will be acceptable.

B. Compatible and approved components from the following manufacturers are acceptable:
   1. Canton Elevator, Inc.
   2. Courion
   3. Cetek
   4. EMS Group, Inc.
   5. Peelle Co.
   7. Minnesota Elevator, Inc.
   8. Motion Control Engineering
   9. Vertitron Midwest, Inc.
   10. Virginia Controls, Inc.
   11. Hollister Whitney
   12. Innovation fixtures
   13. ELSCO
   14. EECO
   15. Monitor Controls
   16. MAC
   17. Manufacturer approved in accordance with requirements of Section 01 6000

2.02 OPERATION SYSTEMS

A. General: Provide manufacturer's standard microprocessor operation system elevator as required to provide type of operation system indicated.
   1. Single Elevator, as shown: Provide "automatic operation" as defined in ASME A17.1.
2. Battery-Powered Lowering: If power fails, cars that are at a floor remain at that floor, cycle their doors, and shut down with the doors closed. Cars that are between floors are lowered to a field programmable floor, cycle their doors, and shut down with the doors closed. Cars that are below the field programmable floor are lowered to the next lower floor, cycle their doors, and shut down with the doors closed. System includes rechargeable battery and automatic recharging system.

3. Automatic Dispatching of Loaded Car: When car load exceeds 80 percent of rated capacity, doors will begin closing.

B. Security Features: Provide the following security features, where indicated. Security features shall not affect emergency firefighters' service.
   1. Keyswitch Operation: Push buttons are activated and deactivated by security keyswitches at car control stations and hall push-button stations. Key is removable only in deactivated position.
      a. Coordinate operation, keying and keyswitch device to be compatible with existing or proposed systems.
   2. Car-to-Lobby Feature: Feature, activated by keyswitch at main lobby, that causes car to return immediately to lobby and open doors for inspection. On deactivation by keyswitch, calls registered before keyswitch activation are completed and normal operation is resumed.

2.03 FINISH MATERIALS

A. General: Provide the following materials for exposed parts of elevator car enclosures, car doors, hoistway entrance doors and frames, and signal equipment, as indicated.
   1. Cold-Rolled Steel Sheet: ASTM A 1008, commercial steel, Type B, exposed, matte finish.
   2. Hot-Rolled Steel Sheet: ASTM A 1011, commercial steel, Type B, pickled.
   3. Satin Stainless Steel: ASTM A 666, Type 304, with No. 6, nondirectional satin finish.
   5. Enameled-Steel Sheet: Cold-rolled steel sheet complying with ASTM A 366, matte finish, stretcher-leveled standard of flatness; hot-rolled steel sheet complying with ASTM A 569 may be used for door frames. Provide with factory-applied enamel finish; colors as selected by Architect.
   6. Prime-Painted Steel Sheet: Cold-rolled steel sheet, ASTM A 366, or hot-rolled steel sheet, ASTM A 569, with factory-applied rust-inhibitive primer.
   7. Plastic Laminate: High-pressure type complying with NEMA LD 3, Type HGP for postformed applications and Type HGS for flat applications; color, texture, and pattern as scheduled or otherwise approved by Architect.

2.04 CAR ENCLOSURES

A. Car enclosures shall remain as is with the exception of modifications made necessary to upgrade controls.

2.05 HOISTWAY ENTRANCES

A. General: Shall be reused with the exception of modifications made necessary to upgrade controls.
2.06 SIGNAL EQUIPMENT

A. General: Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Fabricate lighted elements with long-life LED’s and metal faced buttons.

B. Car Control Stations: Provide manufacturer's standard recessed or semirecessed car control stations. Mount in return panel adjacent to car door, unless otherwise indicated.
   1. Mark buttons and switches with standard identification for required use or function that complies with ASME A17.1. Use both tactile symbols and Braille.
   2. 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.

C. Emergency Communication System: 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)." On activation, system dials preprogrammed number of monitoring station and identifies elevator location to monitoring station. 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. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.

D. Car Position Indicator: For passenger elevator cars, provide illuminated-signal type, digital-display type, or segmented type, located above car door or above car control station. Also provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served.
   1. Include travel direction arrows if not provided in car control station.

E. Hall Push-Button Stations: Provide one hall push-button station at each landing. Provide manufacturer's standard wall-mounted units. Mount in existing locations if possible. Report any issues to Owner’s representative or Architect.

END OF SECTION 14 2823
HVAC OUTLINE SPECIFICATION

SECTION 230500 - COMMON WORK RESULTS FOR HVAC

A. Description of Work: The work in general includes, but is not limited to, the following:

1. Hot water space heating system:
   a. Condensing type hot water boilers
   b. Circulating pumps
   c. Hydronic Specialties
      1) Bladder type expansion tanks
      2) Coalescing type air and dirt separator
      3) Triple-duty valves
      4) Suction diffusers
      5) Automatic and manual air vents
      6) Relief Valves
   d. Complete Piping System with the following specialties:
      1) Valves - check and isolation
      2) Balance devices
      3) Factory fabricated expansion loops
   e. Chemical treatment one-shot filter feeder
   f. Glycol feed unit

2. Constant air volume, roof mounted, packaged air conditioning units with each unit having a refrigerant-based cooling system and a hot water heating coil.
3. Variable air volume, roof mounted, packaged air conditioning units with each unit having a refrigerant-based cooling system and a hot water heating coil.
4. Roof-mounted and in-line exhaust fans.
5. Hot water, terminal heating equipment
6. Wall louvers.
7. Boiler flues.
8. Sheet metal systems:
   a. Low pressure ductwork.
   b. Balance dampers.
c. Automatic dampers.
d. Fire dampers.
e. Combination fire/smoke dampers.
f. Access panels.
g. Turning vanes.

11. Insulation for piping, ductwork, and equipment.
12. Testing, adjusting, and balancing.
14. Motor starters
15. Variable frequency drives.
16. Concrete pads for all floor-mounted equipment.
17. Cleaning of all equipment, piping, and ductwork.
18. Demonstration of successful system operation.
19. Project close out documentation including record drawings.
20. Owner training.

B. Related Codes and Documents: All work shall be installed in accordance with acceptable trade standards and practices. Accepted trade standards or practices shall be documented and shall be based on sound engineering design principals. All work shall meet all applicable codes and standards which include, but are not limited to:

1. 2009 International Building Code
2. Occupational Safety and Health Act (OSHA)
3. NFPA 90A
4. All approved published instructions set forth by equipment manufacturers.
5. SMACNA

C. Method of Procedure: The HVAC Trade shall coordinate with the Plumbing Trade, the Electrical Trade, and all other contractors and subcontractors with regard to the locations of their equipment, pipe, conduit, outlets, etc. before erecting any work in order to avoid any interference. In case of interferences, these discrepancies shall be reported to the General Contractor and Architect, who shall decide which work is to be relocated regardless of which work was first installed. Any such changes required shall be made without additional expense to the Owner. The HVAC Trade shall cooperate with all other Contractors and Subcontractors for the proper securing and anchoring of all work included in these specifications.

D. Instructions of Owner's Personnel: The HVAC Trade shall provide without expense to the Owner, competent instructors for a period of not less than two four-hour sessions to train the Owner's Personnel who will have charge of the apparatus and equipment, in the care, adjustment and operation of all parts of the mechanical equipment. The instructor(s) shall obtain signed receipts for his instruction time from personnel instructed and shall give a copy of this receipt to the Architect.

E. Maintaining Integrity of Fire Rated Construction: All penetrations by pipes, ducts, conduit, etc. through floors (other than floors on grade) and fire-rated walls shall be sealed with fire resistant sealant to maintain the fire-rating of the floors/walls. The sealant shall be rated to prevent passage of flames, smoke, hot gases or other products of combustion through each floor, wall or partition.

F. Concrete Equipment Pads: Concrete pads shall be a minimum of 4 inches thick (unless otherwise noted on the drawings), with plan dimensions 3 inches greater, on all sides, than the equipment being supported. Concrete pads shall be reinforced with 6 by 6 - W2.9 by W2.9 welded wire fabric. Concrete
shall have a compressive strength of 3000 psi at 28 days.

1. Concrete pads shall be provided for floor mounted equipment including base mounted pumps, hot water boilers, expansion tanks and glycol feed units.

G. Miscellaneous Steel: The HVAC Trade shall provide all materials, equipment, supplies and labor necessary to construct all miscellaneous structural steel work required for the installation of his work. The design, materials, fabrication, and erection shall conform to the appropriate codes of the American Institute of Steel Construction.

SECTION 230511 - ENCLOSED MOTOR CONTROLLERS FOR HVAC EQUIPMENT

A. Enclosed Controllers

1. Three phase enclosed controllers (motor starters) shall be a magnetic combination type starter with the following features:
   a. Fusible disconnect switch.
   b. Hand-Off-Auto (HOA) switch.
   c. Red "RUN" pilot light on cover.
   d. Integral 120 volt control transformer with primary fusing and a secondary fuse in the "hot" leg.
   e. One normally open auxiliary contact.
   f. A NEMA Class 20 three phase overload relay.

2. All enclosed controllers located indoors shall be housed in a NEMA 1 cabinet. All enclosed controllers located outdoors shall be housed in a NEMA 3R cabinet.

3. All enclosed controllers shall be UL listed.

4. Enclosed controllers shall be manufactured by shall be manufactured by ABB, Toshiba International Corporation, or Yaskawa.

SECTION 230512 - VARIABLE FREQUENCY MOTOR CONTROLLERS FOR HVAC EQUIPMENT

A. Variable Frequency Controllers (VFCS):

1. Description: NEMA ICS 2, IGBT, PWM, VFC; listed and labeled as a complete unit and arranged to provide variable speed of a NEMA MG 1, Design B, 3-phase, premium-efficiency induction motor by adjusting output voltage and frequency.

2. Design and Rating: Match load type such as fans, blowers, and pumps; and type of connection used between motor and load such as direct or through a power-transmission connection.

3. Output Rating: 3-phase; 6 to 60 Hz, with voltage proportional to frequency throughout voltage range.

4. Each VFC shall have surge suppression; under- and overvoltage trips; inverter over-temperature, overload, and overcurrent trips; adjustable motor overload relays; instantaneous line-to-line and line-to-ground overcurrent trips; loss-of-phase protection; reverse-phase protection; short circuit protection; motor over-temperature fault; power interruption protection; automatic reset and re-start; power interruption protection; status lights; motor temperature compensation at slow speeds; and, an integral fusible-type disconnect switch with locking handle.

5. VFCs shall be manufactured by ABB, Toshiba International Corporation, or Yaskawa.

SECTION 230513 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

A. Motors:
1. All motors shall be built in accordance with the latest standard rules of the National Electrical Manufacturers Association (NEMA) and of the American Institute of Electrical Engineers (AIEE). All motors 5 HP and larger shall be the "energy saver" type, with ratings based on IEEE Test Procedure 112, Method B.
   a. All motors shall be furnished with a 1.15 service factor.
   b. All motors shall be designed and rated for continuous duty at full load for temperature rises not exceeding 40°C above the ambient temperature.
   c. All motors shall operate without undue noise.
   d. Lubricating devices shall be located so as to be easily accessible.

2. Motors shall be manufactured by General Electric, Reliance Electric, Baldor, or Marathon Electric.

SECTION 230516 - EXPANSION FITTINGS AND LOOPS FOR HVAC EQUIPMENT

A. Each expansion loop shall be factory fabricated and constructed of 2 or 3 equal length sections of annular corrugated stainless steel (or bronze) close-pitch hose with stainless steel (or bronze) overbraid that will absorb or compensate for pipe movements in 3 degrees of freedom (3 coordinate axes) simultaneously.

B. Factory fabricated expansion loops shall be manufactured by Flex-Hose, Metraflex, or approved equal.

SECTION 230523 - GENERAL - DUTY VALVES FOR HVAC PIPING

A. Shutoff (isolation) valves shall be provided at the inlet and outlet for each rooftop air handling unit coil, pump, boiler, VAV terminal unit, and terminal heating device.

   1. Ball valves shall be 600 psig, W.O.G. type and shall be provided for piping 2” and smaller.
   2. Butterfly valves shall be the lug type rated for 125 psig and shall have a carbon steel body with stainless steel seat and trim. Valves shall be provided for piping 2-1/2” and larger.

B. Ball valves shall be manufactured by American Valve, Apollo Valves, Crane Valves, Hammond Valve, Milwaukee Valve Company, Nibco, Red-White Valve Corporation, or Watts Regulator Company.

C. Butterfly valves shall be manufactured by Bray Controls, Apollo Valves, Jenkins Valves, DeZurik Water Controls, Hammond Valve, Milwaukee Valve Company, Nibco, Red-White Valve Corporation, or Watts Regulator Company.

SECTION 230529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

A. Pipe Hangers and Supports:

   1. Steel Pipe Hangers and Supports: Design of pipe supporting elements shall be in accordance with ANSI B31.1. Steel hangers shall comply with the requirements of MSS SP-58 and MSS SP-69.

      a. Pipe hangers shall be the clevis type.
      b. Each pipe hanger shall be provided with an insulation shield.
      c. Steel pipe hangers and supports shall be manufactured by AAA Technology & Specialties Co., B-Line Systems, ERICO/Michigan Hanger Co., Grinnell Corp., or National Pipe Hanger Corp.

   2. Metal Framing Systems: MFMA-3, shop- or field fabricated pipe-support assembly made of steel channels and other components.
a. Metal framing systems shall be manufactured by B-Line Systems, ERICO/Michigan Hanger Co., Grinnell Corp, Power-Strut Division of Tyco International, or Unistrut Corp.

3. For all insulated piping 3” and smaller, MSS SP-69 Type 40 insulation protection shield shall be provided.

SECTION 230548 - VIBRATION CONTROLS FOR HVAC PIPING AND EQUIPMENT

A. Pumps, rooftop units, and in-line fans shall be provided with vibration isolation devices.

1. Ceiling mounted fan coil units, ceiling mounted cabinet unit heaters, and in-line exhaust fans shall be provided with spring hangers.

B. Vibration Isolation Control Devices:

1. The following HVAC equipment shall be provided with vibration isolation devices.
   a. Each packaged rooftop unit shall be provided with vibration isolation roof-curb rails.
   b. Each condensing unit 3-tons and smaller in capacity shall be provided with rubber isolation pads.
   c. Each base-mounted pump shall be provided with restrained spring isolators.
   d. Each suspended cabinet unit heater shall be provided with spring hangers.
   e. Each suspended in-line exhaust fan shall be provided with spring hangers.

2. No rigid connections between equipment and building structure shall be made without the use of vibration isolators. Electrical conduit connections to isolated equipment shall be looped to allow free motion of isolated equipment.

3. Each rooftop unit will be provided with In-curb acoustical treatment. The in-curb acoustical treatment shall consist of flexible sound barrier and acoustical insulation in two alternating layers of each material.

   a. The flexible sound barrier shall be a 1-lb./ft.2 non-reinforced barium sulfate loaded vinyl similar to Hush Block™ NRLV-100 as manufactured by BRD Noise and Vibration Control, Inc. The Flexible Sound Barrier shall exhibit a transmission loss not less than that shown below. Transmission Loss values have been tested and determined in accordance with ASTM E-90-75.

   b. The acoustical insulation shall be asbestos free construction, shall have low smoke and flame spread characteristics as per ASTM E-84 test, shall have a nominal 3 lbs./cubic ft. density, and shall be similar to Hush Batt™ HB-200 as manufactured by BRD Noise and Vibration Control, Inc. Acoustical Insulation shall exhibit absorption characteristics not less than that shown below. Absorption values have been tested and determined in accordance with ASTM C-423-77.

4. All vibration isolation equipment shall be manufactured by Amber/Booth Co, Kinetics Noise Control, Mason Industries, Vibration Eliminator Co., Vibration Isolation, or Vibration Mountings & Controls.

SECTION 230553 - IDENTIFICATION FOR HVAC EQUIPMENT

A. Equipment Identification: Equipment shall be provided with 1/16" thick plastic nameplates as manufactured by Seton Nameplate Corporation, W.H. Brady Co. or Communications Technology Corp.

B. Piping Identification: All piping shall be provided with continuously printed, vinyl tape at least 3 mils (0.08 mm) thick with pressure-sensitive, permanent-type, self-adhesive back as manufactured by Seton Nameplate Corporation, W.H. Brady Co. or Communications Technology Corp.
C. Valve Tags: All valves shall be provided with stamped or engraved with 1/4-inch (6.4-mm) letters for piping system abbreviation and 1/2-inch (13-mm) numbers, with numbering scheme as manufactured by Seton Nameplate Corporation, W.H. Brady Co. or Communications Technology Corp.

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

A. BASE BID – No balancing shall be provided.

B. ALTERNATE BID #1

   1. Adjusting, balancing, and testing procedures and compilation of test data shall be performed by an independent agent who is a Certified Test and Balance Engineer registered with AABC, TABB, or NEBB.
   2. The services of an independent Testing, Adjusting and Balancing Specialist shall be retained by HVAC Contractor.
   3. Each air and water system installed on the project shall be balanced.

C. ALTERNATE BID #2

   1. An independent Commissioning Agent will be retained by the School District. The HVAC contractor and their TAB subcontractor shall assist the commissioning agent in completing the commissioning of the HVAC systems.
   2. Adjusting, balancing, and testing procedures and compilation of test data will be performed by an independent agent whose services will be retained by the Commissioning Agent and who is a Certified Test and Balance Engineer registered with AABC, TABB, or NEBB.
   3. Each air and water system installed on the project shall be balanced and commissioned.

SECTION 230700 - HVAC INSULATION

A. Duct Insulation:

   1. Rectangular supply air ductwork shall be lined with 1½-inch thick fiberglass duct liner having an anti-microbial and anti-erosion coating. Round supply air ductwork shall be wrapped with 1½-inch thick fiberglass blanket insulation.
   2. Rectangular return air ductwork shall be lined with 1½-inch thick fiberglass duct liner having an anti-microbial and anti-erosion coating from the inlet of the equipment return connection to a point 30 feet upstream of the return connection.
   3. Kitchen hood exhaust ductwork shall wrapped with fire-rated blanket insulation of a thickness to provide a 2-hour fire rating by a NRTL.
   4. Outdoor air ductwork shall be wrapped with 2" thick fiberglass blanket insulation. Round supply air ductwork shall be wrapped with 1½-inch thick fiberglass blanket insulation.
   5. All ductwork installed outdoors shall be insulated with either 2-inch thick fiberglass blanket insulation or 2-inch thick fiberglass board insulation. A weatherproof aluminum jacket shall be provided over the insulation.

B. Pipe Insulation:

   1. Coil condensate drain piping shall be insulated with ¾-inch thick flexible elastomer (closed cell foam) pipe insulation.
2. Refrigerant piping installed indoors shall be insulated with 1½-inch thick flexible elastomeric (closed cell foam) pipe insulation.
3. Hot water piping installed indoors shall be insulated with 1½-inch thick fiberglass pipe insulation.
4. Refrigerant piping installed outdoors shall be insulated with 2-inch thick flexible elastomeric (closed cell foam) pipe insulation. A weatherproof aluminum jacket shall be provided over the insulation.
5. Hot water piping installed outdoors shall be insulated with 2-inch thick fiberglass pipe insulation. A weatherproof aluminum jacket shall be provided over the insulation.

C. Manufacturers:

1. Duct and pipe insulation shall be manufactured by CertainTeed Corp, Johns Manville, Knauf Insulation, Manson Insulation, or Owens Corning.
2. Fire-rated duct insulation shall be manufactured by CertainTeed Corp, Johns Manville, Nelson Firestop Products, Thermal Ceramics, 3M, Unifrax Corporation, or Vesuvius.

SECTION 230900 - AUTOMATIC TEMPERATURE CONTROL SYSTEM

A. The automatic temperature control system for the HVAC systems and equipment shall be web-based and shall be the stand-alone Direct Digital Control (DDC) type.
B. A central computer operator workstation complete with graphics shall be provided.
C. Wiring shall be in accordance with the latest edition of the National Electric Code.
D. The HVAC equipment and systems shall be controlled to maintain indoor conditions of 75°dB in summer and 72°F in winter at outdoor air design conditions.
E. The automatic temperature control system shall be manufactured by Automated Logic, Alerton (as supplied by Deckman Co.), Johnson Controls Inc., Kreuter Controls (as supplied by Building Control Systems), or Andover (as supplied by Combustion Service & Equipment Co.).

SECTION 232113 - HYDRONIC PIPING

A. Hot water piping 2” in size and smaller shall be Type L hard temper copper complying with ASTM B88. The piping shall have soldered joints using 95/5 solder. The fittings shall be wrought copper complying with ANSI B16.22.

B. Hot water piping 2-1/2” in size and larger shall be Schedule 40 black steel complying with ASTM A53, Grade B. The piping shall be welded. The fittings shall be standard weight steel complying with ASTM A105 or ASTM A106.

C. Coil condensate drain piping shall be Type L hard temper copper complying with ASTM B88. The piping shall have soldered joints using 95/5 solder. The fittings shall be wrought copper complying with ANSI B16.22. Piping shall be run to nearest floor drain or building drain.

D. Pipe accessories to include manual and automatic air vents, strainers, flow control (balancing) valves, pressure/temperature test ports, and flexible pipe connectors shall be provided.

SECTION 232123 - HYDRONIC PUMPS
A. Base Mounted Centrifugal Pumps: Each pump shall be the centrifugal, single stage, end suction type with true back pull out. Cast iron, single suction casing rated for 175 psi at 225°F actual working discharge pressure, renewable bronze wearing rings, flanged suction and discharge with integral pedestal support and gauge, vent and drain ports. Bronze impeller, stainless steel shaft, mechanical seal, heavy-duty regreaseable ball bearings, flexible coupling and coupling guard, heavy gauge steel baseplate, and high efficiency motor.

B. Pump accessories to include suction diffusers, triple duty valves, coalescing type air and dirt separators, and bladder type expansion tanks shall be provided.

C. Pumps shall be manufactured by Armstrong Pumps, Aurora Pump, Bell & Gossett, Grundfos Pumps Corp., PACO Pumps, Patterson Pump Company, or Peerless Pump Company.

SECTION 232300 - REFRIGERANT PIPING

A. All refrigerant piping shall be Type ACR hard temper copper complying with ASTM B88. The piping shall have brazed joints. The fittings shall be wrought copper complying with ANSI B16.22.

SECTION 232500 - WATER TREATMENT

A. Chemicals and service program for maintaining optimum conditions in the circulating water for inhibiting corrosion, scale, and organic growths in the cooling, chilled-water piping and the heating, hot-water piping and equipment shall be provided. Services and chemicals shall be provided for a period of one year from date of Substantial Completion. Also, the following water treatment equipment shall be provided:
   1. Bypass filter feeders. One each for the hot water closed loop system.
   2. Glycol feed unit: One each for the hot water closed loop system.

B. Anti-freeze Solution: Provide the proper amount of propylene glycol to achieve a 30% propylene glycol-water solution for the hot water closed loop system.

C. The Water Treatment Service Provider shall be Capitol Technologies Inc., Chem Aqua, Craft Products Company, or GLA Consultants.

SECTION 233113 - METAL DUCTS

A. Ductwork shall be round or rectangular and shall be constructed in accordance with SMACNA duct construction standards. In general, all ductwork shall be constructed of galvanized steel except as follows:
   1. Exposed kitchen hood exhaust ductwork shall be constructed of 18-gauge welded stainless steel.
   2. Concealed kitchen hood exhaust ductwork shall be constructed of either 18-gauge welded stainless steel or 16-gauge welded black steel.
   3. Dishwasher hood exhaust ductwork shall be constructed of aluminum.
   4. Locker room exhaust ductwork shall be constructed of aluminum.

SECTION 233300 - AIR DUCT ACCESSORIES

A. Balancing dampers, as a minimum, shall be provided at each branch duct serving an air terminal outlet or return duct inlet. Balancing dampers shall be manufactured by Air Balance, Inc., Young Regulator Co., or Louvers and Dampers, Inc.
B. Duct connections to all fans and air handling units shall be made using flexible duct connectors. Flexible connections shall be manufactured by United McGill Corporation or Duro Dyne Corp.

C. Turning vanes shall be provided in all mitered rectangular duct elbows having an angle greater than 45 degrees. Turning vanes shall be manufactured by Aero Dyne Co., Anemostat, Barber Colman Co., or Register and Grille Mfg. Co.

D. Fire dampers shall be provided at all fire rated walls or partitions. Fire dampers shall be rated to maintain the fire rating of the assembly in which they are installed. Fire dampers shall be manufactured by Prefco, Ruskin or Air Balance Inc.

E. Combination fire/smoke dampers, or separate fire dampers and separate smoke dampers, shall be provided at all duct penetrations of shaft walls. Combination fire/smoke dampers shall be rated to maintain the fire and smoke rating of the assembly in which they are installed. Combination fire/smoke dampers shall be manufactured by Prefco, Ruskin or Air Balance Inc.

F. Access doors shall be provided in ductwork at all fire dampers, fans, filters, coils and automatic dampers. Access doors shall be manufactured by E.H. Price, Ruskin, United McGill or Duro Dyne Corp.

SECTION 233423 - HVAC POWER VENTILATORS

A. Roof Exhaust Fans: Roof mounted exhaust fans shall be the centrifugal dome type, direct-driven or belt driven, with bird screen, disconnect switch and motorized damper.

B. Kitchen Hood Exhaust Fans: Kitchen hood exhaust fans shall be roof mounted centrifugal upblast type, direct-driven or belt driven, with disconnect switch and shall comply with UL 762 requirements.

C. In-line Exhaust Fans: Indoor exhaust fans shall be the in-line, centrifugal square type, direct-driven or belt driven, with disconnect switch and a duct mounted automatic air damper.


SECTION 233600 - AIR TERMINAL UNITS

A. All variable air volume terminal boxes shall be the pressure independent type with primary air valve with flow sensor. Each terminal box shall be insulated with heavy matte-faced insulation for noise reduction. Each terminal box shall be furnished with a hot water reheat coil.


SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

A. Registers and Grilles: Registers and grilles shall be the fixed blade type constructed of steel. Finish shall be baked enamel in a color selected by Architect. Face blades shall be fixed horizontal blades spaced 3/4 inch on center.

B. Diffusers: Diffusers shall be the square plaque type constructed of steel. Finish shall be baked enamel in a color selected by Architect. Face size shall be 24 by 24 inches (600 by 600 mm). Accessories shall include a square to round neck adaptor, as necessary, and an equalizing grid.
C. Manufacturers: Diffusers, registers and grilles shall be manufactured by Anemostat Products, Krueger, Price Industries, Titus, or Tuttle & Bailey.

SECTION 233733 - LOUVERS

A. Louvers shall be the horizontal, drainable blade type constructed of galvanized-steel sheet. Louvers shall be 6-inches deep. Louvers shall have exposed mullions. Louvers shall have a baked enamel finish in a color selected by Architect.

B. Louvers shall be manufactured by Airolite, Greenheck, Pottorff, or Ruskin.

SECTION 235100 - BREECHINGS AND STACKS

A. Breeching and stacks for the condensing boiler(s) shall be a listed, double wall, positive pressure type with the inner liner constructed of type 29-4C stainless steel and the outer jacket constructed of type 430 stainless steel. The inner liner and outer jacket shall be separated by a minimum of ½-inch airspace.


SECTION 235216 - CONDENSING BOILERS

A. Each hot water boiler shall be the condensing type and shall consist of a stainless steel fire-tube heat exchanger complete with trim, gas trains, burner, and boiler control system.

B. Condensing boilers shall be manufactured by Aercot, Fulton, Hydrotherm, RBI or Viessmann.

SECTION 237413 - OUTDOOR CENTRAL STATION AIR HANDLING UNITS

A. Each outdoor central station air handling unit shall be the double wall type. Each outdoor central station air handling unit shall contain a supply fan with variable frequency drive, multiple direct expansion refrigeration circuits with capacity modulation on the lead circuit, a hot water coil, filters, an airside economizer, a heat recovery device (where applicable), a return fan (where applicable) with a variable frequency drive, and an exhaust fan (where applicable) with variable frequency drive. Filters shall have a minimum MERV-8 rating.

B. Each outdoor central station air handling unit shall be provided with a vibration isolation roof curb-rail.

C. Outdoor central station air handling units shall be manufactured by Aaon, Carrier, Daikin/McQuay, JCI/York, or Trane.

SECTION 238126 - SPLIT SYSTEM AIR CONDITIONERS

A. Indoor Unit: The indoor fan coil unit shall be a ceiling cassette or wall cabinet of heavy gauge galvanized steel design, bonderized and finished with a powder coated baked enamel. The indoor unit shall consist of a supply fan, an evaporator coil, an electronic expansion valve, and microprocessor controls. The unit shall be furnished with a condensate pump.

B. Outdoor Unit: The outdoor shall be fabricated of heavy gauge galvanized steel, bonderized and finished with a powder coated baked enamel. The unit shall consist of a direct drive, variable speed propeller type fan, a condenser coil with aluminum fins and copper tubing, an inverter driven, modulating capacity scroll
compressor, and microprocessor controls. A crankcase heater shall be factory mounted on the compressor. The outdoor unit shall be provided with all refrigerant safeties.

C. Controls:

1. Controls: One terminal unit controller shall be used for each indoor terminal unit. Control wiring shall be installed in a daisy chain configuration from indoor unit to indoor unit then to the outdoor unit. Control wiring shall run from the indoor unit terminal block to the controller associated with that unit. Each controller shall have at a minimum the following abilities:
   a. The mode can be selectively used depending on the application configuration.
   b. The range of room temperature setting can be limited by the initial setting. By setting the room temperature range narrower than usual setting, cooling/heating operation with excessive temperature can be prevented thus saving energy easily.
   c. Each shall be equipped with simplified button locking function.
   d. Operating mode shall switch between Cool/Dry/Auto/Fan/Heat.
   e. The range of the temperature setting shall be 66°F to 86°F for cooling and 63°F to 83°F for heating.

D. Manufacturers: The ductless split-system air conditioner shall be manufactured by Mitsubishi, LG Systems, Sanyo or Daikin.

SECTION 238213 - RADIANT HEATING HYDRONIC PANELS

A. Each hot water radiant ceiling panel shall be a linear sheet metal panel with serpentine water piping, suitable for lay-in installation flush with T-bar ceiling grid recessed mounting. Panels shall be constructed of minimum 0.0336-inch- (0.86-mm-) thick, galvanized-steel or 0.0396-inch- (1.0-mm-) thick, aluminum sheet. Backing insulation shall be minimum 1-inch- (25-mm-) thick, mineral or glass fibers bonded with a thermosetting resin. All trim accessories necessary for a complete installation and a finished appearance shall be provided.

B. Hot water radiant ceiling panels shall be manufactured by Airtex Radiant Systems, Vulcan, or TWA Panel Systems Inc.

SECTION 238233 - CONVECTORS

A. Convec tors shall be the horizontal hot water type constructed of heavy gauge steel with a baked enamel finish. The unit heating element shall be a copper coil with aluminum fins.

B. Hot water convectors shall be manufactured by Dunham-Bush, Engineered Air, Rittling, Rosemex, Slant/Fin, Trane, or Vulcan.

SECTION 238236 - FINNED TUBE RADIATION HEATERS

A. Finned tube radiation shall be the floor mounted (pedestal) or wall mounted hot water type and shall be constructed of heavy gauge steel. The unit heating element shall be copper coil with aluminum fins.

B. Hot water finned tube radiation shall be manufactured by Dunham-Bush, Engineered Air, Rittling, Rosemex, Slant/Fin, Trane, or Vulcan.

SECTION 238239.13 - CABINET UNIT HEATERS
A. Cabinet unit heaters shall be the floor mounted hot water type and shall be constructed of heavy gauge steel. The unit shall consist of a centrifugal fan, motor, and copper coil with aluminum fins.

B. Hot water cabinet unit heaters shall be manufactured by Airtherm, Daikin/McQuay, Dunham-Bush, Engineered Air, International Environmental Corporation, Rittling, Rosemex, Trane, USA Coil & Air, or Vulcan.

SECTION 238239.16 - PROPELLER UNIT HEATERS

A. Propeller unit heaters shall be the horizontal hot water type and shall be constructed of heavy gauge steel. The unit shall have a propeller fan, motor, and copper coil with aluminum fins.

B. Hot water propeller unit heaters shall be manufactured by Airtherm, Daikin/McQuay, Dunham-Bush, Engineered Air, International Environmental Corporation, Rittling, Rosemex, Trane, USA Coil & Air, or Vulcan.

END OF HVAC OUTLINE SPECIFICATION
DIVISION 210000 - FIRE PROTECTION

SECTION 211000 WATER BASED FIRE PROTECTION SYSTEMS

A. Quality Assurance

1. The Fire Protection System and components shall comply with all laws, ordinances, rules and regulations of all local authorities having jurisdiction and the Commonwealth of Pennsylvania. The Fire Protection System shall be subject to the approval of these authorities. In addition, all work and materials to be provided under this Section of the Specification shall conform to the applicable requirements of the National Board of Fire Underwriters Standards, the International Fire Code, and National Fire Protection Association Standards. All threads shall conform to local Fire Department Standards.

B. Products


3. Double Detector Check Valves (Over 2 Inches): Cast iron, 175 WWP, bronze seats, replaceable rubber clappers, pair of OS&Y iron gate valves, bypass meter and check valve assembly, test cocks, and one air vent per check valve.

4. Sprinkler Heads: 1/2 inch orifice, 165°F, concealed chrome pendant type with matching cover plate for finished ceiling areas. Standard upright type with brass finish and guard for unfinished ceiling areas. Dry semi-recessed and upright type for areas subject to freezing. Provide epoxy coated sprinkler heads in any high corrosion areas.

5. Gate Valve, Above Ground (Over 2 Inches): Ductile iron body, ASTM A536, 300 WWP, bronze trim, rising stem and hand wheel, OS & Y, Positive Displacement Disk™, bolted bonnet, grooved ends, UL listed and FM approved.

6. Ball Valves (Up to 2 Inches): Bronze two piece body, 400 psi WOG, chrome plated bronze ball, Teflon seats and stuffing box ring, lever handle, threaded ends, UL listed.
7. Butterfly Valves (Over 2 Inches): Iron body ASTM A126 or A395, or A536, Class 300, ductile iron disc, Buna-N seat, lug or grooved coupling style body, stainless steel stem, gear operator, indicator flag, locking hub, UL listed.

8. Check Valves (Over 2 Inches): Ductile iron body, ASTM A395 and A536, 250 WWP, spring assisted swing disc, grooved ends, UL listed.

9. Fire Department Valve: Adjustable Pressure Angle Valve, 2-1/2 inch nominal size, cast brass, red hand wheel, 300 psi adjustable flow restrictor with override, cap and chain.

10. Fire Department Connection: Cast brass or aluminum, one way, Storz, cast finish, 2-1/2 inch size, threaded size to match fire department hardware, automatic drip connected to drain, threaded dust cap and chain of same material and finish, individual clapper on each outlet, matching escutcheon marked "Sprinkler - Fire Department Connection".

11. Post Indicators: Vertical indicator post, indicated valve position as open or closet, windows on both sides, UL listed.

12. Flow Switches: Vane type water flow switch with red enamel finish and cast aluminum enclosure, two sets of S.P.D.T. (Form C) contacts, flow sensitivity adjustment, and adjustable pneumatic retard.

13. Pressure Switches: Pressure switch for monitoring dry pipe and wet alarm check valves, 1/2 inch male NPT pressure connection, two sets of S.P.D.T. (Form C) contacts, cover tamper switch, and adjustable differential.

14. Valve Monitor Switches: Valve monitor switch for OS&Y valves, two sets of S.P.D.T. (Form C) contact, and tamper resistant cover that causes the switch to operate when removed.

15. Pressure Gauges: 4-1/2 inch diameter drawn steel case, liquid filled phosphor bronze bourdon tube, rotary brass movement, 1/4 inch brass socket, black scale on white background, dial range of 0 to 250 psig, one percent mid-scale accuracy with a scale calibrated in psi, tee or lever handle gage cock.

16. Fire Pump: Horizontal split-case with jockey pump and controller with transfer switch. The fire pipe will consist of a horizontal split-case 25 HP fire pump at 650 GPM @ 173 TDH, 480 V 3 phase, 60 Hz. There will be a closed coupled vertical type jockey pump rated at 5 GPM @ 173 TDH. ¾ HP, 480 V, 3 phase, 60 Hz. The pump shall deliver not less than 150% of rated capacity at a pressure not less than 65% of rated pressure. Minimum suction pressure is 10 PSIG. Motor and pump speed shall not exceed 3500 RPM. Unit provided under provision NFPA-20, 1993, paragraph #1-5. Unit pressure shut-off head shall not exceed 140% of rated pressure. Both pumps shall use a soft start fire pump controller.

DIVISION 220000 - PLUMBING

SECTION 220500 - GENERAL PROVISIONS AND COMMON WORK RESULTS FOR PLUMBING

A. Project Includes

1. The work to be performed under these specifications shall include providing all labor, materials and equipment necessary to furnish and install, complete, properly and fully, all Plumbing Work herein specified and/or necessary thereto, whether or not specified herein in detail, and/or reasonably implied, and leaving the same in satisfactory operating condition. It is the intent of these specifications that a complete and operating system shall be installed and this Contractor shall carefully examine the site, plans, and specifications, and shall include all items necessary to accomplish this purpose.

2. Without intending to limit or restrict the volume of work required by this specification and the applicable drawings, the work generally consists of:

   a. Complete Plumbing systems including sanitary, waste, vent, hot water and cold water piping, specialties and equipment.
b. Complete water heating system including water heater(s), storage tanks, pumps, piping and piping specialties.

c. Thermal insulation of equipment and piping.

d. Concrete pads for all floor mounted equipment.

e. Cleaning of all equipment, piping and fixtures.

f. Painting of equipment, piping, supports and hangers.

g. Testing, balancing and adjusting.

h. Vibration isolation equipment.

i. Structural and Mechanical Engineering services for the design and support of all piping systems for pipe sizes 6" and larger.

j. Operating and maintenance instructions and manuals.

k. Demonstration of successful system operation.

B. Quality Assurance

1. Qualification for Bidders: The Plumbing Contractor shall be experienced in work similar to that indicated for this Project and shall have a record of successful in-service performance.

2. Laws, Codes, and Regulations: Comply with applicable laws and regulations in accordance with the General Conditions and Supplementary Conditions.

3. All work shall be installed in accordance with accepted trade standards or practices. Accepted trade standards or practices shall be documented and shall be based on sound engineering design principles. Accepted trade standards or practices must include a statement indicating that the specific application in question is included within its scope. Accepted trade standards and practices must be documented through an engineering society or trade organization.

4. Conform to the 2009 International Building Code and any other codes required by the local jurisdiction.


SECTION 220700 - PIPING INSULATION

A. Products

1. Type A: ASTM C547; rigid molded, noncombustible glass fiber.

   a. 'K' (ksi) Value: ASTM C335, 0.24 at 75°F.
   b. Maximum Moisture Absorption: 0.20 percent by volume.
   c. Minimum Service Temperature: -20°F.
   d. Maximum Service Temperature: 650°F.
   e. Jacket: Vapor barrier jacket with PVC fitting covers.

B. Schedule

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<tr>
<th>Piping</th>
<th>Fluid Temp (F)</th>
<th>Insulation Pipe Size (inches)</th>
<th>Thickness (inches)</th>
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<td>Rain Water Conductors</td>
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<td>and Roof Drain Body</td>
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SECTION 221116 - DOMESTIC WATER PIPING

SECTION 221316 - SANITARY WASTE AND VENT PIPING

SECTION 221413 - FACILITY STORM DRAINAGE PIPING

SECTION 231123 - FACILITY NATURAL GAS PIPING

A. Project Includes

1. Plumbing piping systems within the building including the following:
   a. Potable water distribution, including cold and hot water supply and hot water circulation.
   b. Drainage and vent systems, including sanitary and storm.

B. Quality Assurance


C. Products

1. Pipe, Fittings, and Joints:
   a. Sanitary Sewer and Vent Piping, Buried Within 5 Feet of Building
      1) PVC Pipe: ASTM D2665, Schedule 40.
      2) Fittings: PVC
      3) Joints: ASTM D2855, solvent weld, NSF seal.
   b. Sanitary Sewer and Vent Piping, Above Grade (Plenum Spaces)
      1) Cast Iron Pipe: CISPI 301, hubless, service weight.
      2) Fittings: Cast iron.
      3) Joints: Neoprene gaskets and (heavy duty) stainless steel clamp and shield assemblies.
   c. Sanitary Sewer and Vent Piping, Above Grade (Non-plenum Spaces)
      1) PVC Pipe: ASTM D2665, Schedule 40.
      2) Fittings: PVC.
      3) Joints: ASTM D2855, solvent weld, NSF seal.
d. Water Piping, Underground

1) Cast Iron Pipe: AWWA C151, Class 52, double cement lined, coated, twice the thickness required by AWWA C104.
2) Fittings: AWWA C153/A21.53, Class 54, compact ductile iron, coated, rated at 350 psi, manufactured by U.S. Pipe or Tyler Pipe.
3) Joints: AWWA C111/A21.11, mechanical joint with gland, neoprene gaskets, 3/4" x 3-1/2" bolts with nuts.

e. Water Piping, Above Grade

1) Copper Tubing: ASTM B88, Type L, hard drawn.
3) Joints: ASTM B32, solder, Grade Sn95.

f. Storm Water Piping, Buried Within 5 Feet of Building

1) PVC Pipe: ASTM D2665, Schedule 40.
2) Fittings: PVC
3) Joints: ASTM D2855, solvent weld, NSF seal.

g. Storm Piping, Above Grade (Plenum Spaces)

1) Cast Iron Pipe: CISPI 301, hubless, service weight.
2) Fittings: Cast iron.
3) Joints: Neoprene gaskets and (heavy duty) stainless steel clamp and shield assemblies.

h. Storm Piping, Above Grade (Non-plenum Spaces)

1) PVC Pipe: ASTM D2665, Schedule 40.
2) Fittings: PVC.
3) Joints: ASTM D2855, solvent weld, NSF seal.

i. Natural Gas Piping, Buried Within 5 Feet of Building

1) Steel Pipe: ASTM A53 or A120, Schedule 40 black steel.
2) Fittings: ASTM A234, forged steel welding type.
3) Joints: AWS D1.1, welded.
4) Casing: Same as pipe and fittings, except with AWWA C105 polyethylene Jacket or Double Layer, Half-Lapped 10 Mil Polyethylene Tape.

j. Natural Gas Piping, Above Grade

1) Steel Pipe: ASTM A53 or A120, Schedule 40 black.
2) Fittings: ASME B16.3, malleable iron, or ASTM A234, forged steel welding type.
3) Joints: Screwed for pipe two inches and under; AWS D1.1, welded, for pipe over two inches.
4) Casing: Same as pipe and fittings.

2. Valves:
a. Lead-free Gate, globe, ball, butterfly, and check valves suitable for service.

SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

SECTION 221123 - DOMESTIC WATER PUMPS

SECTION 221319 - SANITARY WASTE PIPING SPECIALTIES

SECTION 221423 - STORM DRAINAGE PIPING SPECIALTIES

A. Project Includes

1. Plumbing specialties for water distribution systems; soil, waste, and vent systems; and storm drainage systems.

2. Specialties:

   a. Water Meters: Provided by Water Company to monitor service to the respective user. Plumbing contractor responsible for associated fees.

   b. Backflow Preventers: ASSE Standard reduced pressure zone and double check backflow preventers for flow rate and maximum pressure loss required, 150 psig (1035 kPa) minimum working pressure.

   c. Miscellaneous Piping Specialties: Strainers, hose bibbs, wall hydrants, roof hydrants, hose-end drain valves, stop and waste drain valves; water hammer arresters, trap seal primer valves, valves, stack flashing fittings, vent caps, vent terminals and roof flashing assemblies.

   d. Duplex Domestic Water booster system with hydro-pneumatic tank on same housekeeping pad. Pump based on (2) 170 GPM @ 181 TDH, 15 HP 3500RPM with a rated capacity of 370 GPM and system pressure of 83 PSI.

   e. Cleanouts: Cast iron cleanouts, ASME A112.36.2M.

   f. Floor Drains and Floor Sinks: Cast iron floor drains and floor sinks, ASME A112.21.1M.

   g. Roof Drains: Cast iron body, ASME A112.21.2M with combination flashing ring and gravel stop.

   h. Non-Freeze Roof Hydrants located on roof.

   i. Sleeve Penetration Systems: UL 1479, through-penetration firestop assembly.

   j. Non-freeze concealed wall hydrants.

SECTION 223400 - FUEL FIRED DOMESTIC WATER HEATER(S)

A. Project Includes

1. Commercial water heater(s) boilers and storage tanks for potable water heat systems.

B. Quality Assurance


C. Products

1. Gas Fired Water Heater(s) DWH-1 thru DWH-4
a. The water heater(s) shall be a LOCHINVAR ARMOR AWN200 and shall be operated on Natural Gas. The water heater(s) shall be capable of full modulation firing down to 10% of rated input with a turn down ratio of 10:1.

b. The water heater(s) shall bear the ASME "HLW" stamp and shall be National Board listed. There shall be no banding material, bolts, gaskets or "O" rings in the header configuration. The stainless steel combustion chamber shall be designed to drain condensation to the bottom of the heat exchanger assembly. A built-in trap shall allow condensation to drain from the heat exchanger assembly. The complete heat exchanger assembly shall carry a five (5) year limited warranty.

c. The water heater(s) shall be certified and listed by C.S.A. International under the latest edition of the harmonized ANSI Z21.10.3 test standard for the US and Canada. The water heater(s) shall comply with the energy efficiency requirements of the latest edition of the ASHRAE 90.1 Standard. The water heater(s) shall operate at a minimum of 96% thermal efficiency. The water heater(s) shall be certified for indoor installation.

d. The water heater(s) shall be constructed with a heavy gauge steel jacket assembly, primed and pre-painted on both sides. The combustion chamber shall be sealed and completely enclosed, independent of the outer jacket assembly, so that integrity of the outer jacket does not affect a proper seal. A burner/flame observation port shall be provided. The burner shall be a premix design and constructed of high temperature stainless steel with a woven metal fiber outer covering to provide modulating firing rates. The water heater(s) shall be supplied with a gas valve designed with negative pressure regulation and be equipped with a variable speed blower system, to precisely control the fuel/air mixture to provide modulating water heater(s) firing rates for maximum efficiency. The water heater(s) shall operate in a safe condition with gas supply pressures as low as 4 inches of water column.

e. The water heater(s) shall utilize a 24 VAC control circuit and components. The control system shall have a Liquid Crystal touch screen display for water heater(s) set-up, water heater(s) status, and water heater(s) diagnostics. All components shall be easily accessed and serviceable from the front and top of the jacket. The water heater(s) shall be equipped with; a high limit temperature control certified to UL353, ASME certified pressure relief valve, outlet water temperature sensor, inlet water temperature sensor, a flue temperature sensor, low water flow protection, built-in freeze protection and a condensate trap for the heat exchanger condensate drain. The manufacturer shall verify proper operation of the burner, all controls and the heat exchanger by connection to water and venting for a factory fire test prior to shipping.

f. The water heater(s) shall feature the “Smart System” control with a Liquid Crystal touch screen display with password security, pump delay with freeze protection, pump exercise, and a PC port connection. The water heater(s) shall feature night setback for the domestic hot water tank. The water heater(s) shall have the capability to accept a 0-10 VDC input connection for BMS control of modulation or set point and enable/disable of the water heater(s). The water heater(s) shall have a built-in cascading sequencer. The cascading sequencer shall be capable of rotation while maintaining modulation of up to eight water heater(s) without utilization of an external controller. The control shall be compatible with optional Modbus communication. Supply voltage shall be 120 volt / 60 hertz / single phase.

g. The water heater(s) shall be equipped with two terminal strips for electrical connection. A low voltage connection board with data points for safety and operating controls, i.e., Auxiliary Relay, Auxiliary Proving Switch, Alarm Contacts, Runtime Contacts, Flow Switches, Tank Thermostat, Tank Sensor, Building Management System Signal, Modbus Control Contacts and Cascade Control Circuit. A high voltage terminal strip shall be provided for supply voltage. The high voltage terminal strip plus integral relays are provided for independent control of the Domestic Hot Water Pumps.

h. The water heater(s) shall be installed and vented with a:
i. Direct Vent Vertical system with a vertical roof top termination of both the vent and combustion air. The flue shall be PVC, CPVC, Polypropylene or Stainless Steel sealed vent material terminating at the roof top with the manufacturers specified vent termination. A separate pipe shall supply combustion air directly to the water heater(s) from the outside. The air inlet pipe may be PVC, CPVC, Polypropylene, ABS, Galvanized, Dryer Vent, or Stainless Steel sealed pipe. The air inlet must terminate on the roof top with the manufacturer's specified air inlet cap. The water heater(s)'s total combined air intake length shall not exceed 100 equivalent feet. The water heater(s) total combined exhaust venting length shall not exceed 100 equivalent feet. *Foam Core pipe is not an approved material for exhaust piping.*

j. The water heater(s) shall have an independent laboratory rating for Oxides of Nitrogen (NO$_x$) of 20 ppm or less, corrected to 3% O$_2$.

k. The water heater(s) shall operate at altitudes up to 4,500 feet above sea level without additional parts or adjustments.

l. M9 Direct Spark Ignition with Electronic Supervision

m. Condensate kit

2. Storage Tank(s) DST-1 & DST-2

a. The storage tank(s) shall be a Lochinvar Lock-Temp "Energy Saver" vertical tank. The tanks shall be constructed with an inner chamber baffle designed to receive all circulation to and from the water heater(s) to eliminate turbulence in the tank. The baffled tank shall supply 80% of tank capacity without a drop in outlet temperature, regardless of rate of draw.

b. The storage tank shall be constructed in accordance with (Standard) (ASME Boiler and Pressure Vessel Code) requirements, (if ASME – “HLW” stamped and registered with the National Board of Boiler and Pressure Vessel Inspectors). The tank shall be furnished with the following connections: two 3" NPT dielectric circulating connections (2-1/2" NPT on 175 & 200 gallon, 2" NPT on 80, 85, 100, & 120 gallon), one 2" NPT dielectric hot water outlet, one 1-1/4" NPT relief valve connection (1" NPT on tanks with diameters 28" and smaller), one 3/4" NPT aquastat opening and one 1" NPT drain connection (3/4" NPT drain connection on tanks with diameters 28" and smaller) (special size connections may be specified).

The storage tank shall have a working pressure of 125 PSI (150 PSI). The interior of the storage tank shall be (glass lined and fired to 1600° F to ensure a molecular fusing of glass and steel, furnished with magnesium anodes and carry a five (5) year limited warranty).

c. The storage tank shall be constructed with a heavy gauge galvanized steel jacket assembly, primed and pre-painted on both sides with a minimum dry film thickness of 0.70 mills. The storage tank shall be completely encased in a minimum of 2" thick, high density polyurethane foam insulation to meet the energy efficiency requirements of the latest edition of the ASHRAE 90.1 Standard.

**SECTION 224000 - PLUMBING FIXTURES**

**SECTION 224700 - DRINKING FOUNTAINS AND WATER COOLERS**

A. Project Includes

1. Plumbing fixtures and trim, fittings, and related accessories and appliances.

B. Quality Assurance

1. Compliance: ANSI A117.1; Applicable accessibility regulations.
C. Products

1. Plumbing Fixtures:
   a. Water Closets: 1.6 gal per flush cycle, vitreous china, siphon-jet flushing action, elongated bowl, wall hung, rear outlet, standard, child and ADA rim heights, and battery sensor flush valves.
   b. Urinals: 1.0 gal per flush cycle, vitreous china, washout flushing action, wall hung, rear outlet, standard, child and ADA mounting heights, and battery sensor flush valves.
   c. Lavatories: Vitreous china, wall hung, standard, child and ADA mounting heights, and battery sensor faucets. Exposed piping below all lavatories shall be insulated with Truebro Handi Lav-Guard Model No. 102 insulation kit, and shall not have any sharp or abrasive surfaces.
   d. Multi-Station Lavatories: Two or three users, infra-red sensor, wall-mounted; no soap dispenser.
   e. Sinks: ADA compliant stainless steel sinks with gooseneck faucets standard flow aerators, and wrist blade or lever type handles. Exposed piping below all sinks shall be insulated with Truebro Handi Lav-Guard Model No. 102 insulation kit, and shall not have any sharp or abrasive surfaces.
   f. Mop Basins: 24 inch x 24 inch, floor mounted, molded fiberglass, exposed wall type faucet with lever handles and vacuum breaker, hose end spout. Provide plain end reinforced rubber hose, hose clamp, stainless steel wall guards, mop hanger and vinyl bumper guard. Provide additional hose bib for floor cleaning solutions.
   g. Water Coolers: ARI 1010, Dual one piece, high-low type, capacity, and fittings suitable for service required. Provide ADA apron for installations not in alcoves. No bottle fillers. Except in Gymnasium Area. Drinking Fountain for playground area.
   h. Outlet Boxes: Molded fiberglass, hose bibb shutoff, recessed wall-mounting, made for dishwashers, ice makers, refrigerator icemakers, coffee stations, laundries, etc.
   i. Toilet Seats: Open-front, elongated, no cover, self-sustaining check hinge.
   j. Flush Valves: Battery Sensor type, 1.6 gpf.
   k. Commercial Sink Faucets: Cast-brass faucets, lever-handle, 1.5 gpm low flow aerators.
   l. Lavatory Faucets: Cast-brass faucets, battery sensor, 0.5 gpm low flow aerators.
   m. Fittings, Except Faucets: Supplies, stops, traps, continuous wastes, and escutcheons.
   n. Supports: ASME A112.6.1M, categories and types as required for fixtures required, including wall reinforcement.

END OF PLUMBING - FIRE PROTECTION OUTLINE SPECIFICATION
SECTION 260100 - BASIC ELECTRICAL REQUIREMENTS

A. Overview

1. The Installer shall be responsible for all permits and inspections required by laws, ordinances, rules, and regulations having jurisdiction for this project.
2. In general, the electrical work shall be as required and necessary to form complete and operable electrical systems, as required by new construction. This shall include, but not be limited to, the items described in the project scope.

B. Project Scope

1. Refer to Narrative document.

C. Codes

1. The electrical installation shall comply fully with the National Electric Code (NEC) and all applicable local, county, and state laws, ordinances and regulations.

D. Products

1. All equipment and/or materials for which Underwriter's Laboratories have established standards shall bear a UL label.
2. Comply with the manufacturer's published instructions and recommendations as minimum criteria for the installation of equipment and/or material.

E. Temporary:

1. The Contractor shall provide temporary wiring for lighting and power as required.

F. Testing

1. Perform all tests as directed by the inspection authority and as required herein.
2. Upon completion of work all component parts, both singular and as a whole, shall be set, calibrated, adjusted to suit load conditions.
3. Perform continuity tests on all power and equipment branch circuit conductors. Verify proper phasing connections.
SECTION 260519 - LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

A. All conductors and cables for feeder shall be aluminum, 98% conductivity.

B. All conductors and cables for branch circuiting and mechanical equipment shall be copper, 98% conductivity.

C. Conductors shall be stranded with 600 volt THHN/THWN insulation.

D. Minimum wire size shall be #12 AWG for light and power wiring; #14 for control wiring, or as noted.
   1. Exception: All emergency lighting circuit wiring shall be #10 AWG minimum.

E. Conductors and cables for communications and signaling systems shall be type, size and insulation as recommended by the manufacturer.

F. Field installed conductors through or within light fixture housings or channels shall be type and size UL approved for the intended use (type SF-20, with 200°C rating).

G. Installation of a raceway shall be complete prior to pulling conductors or cables into the raceway. Use UL approved pulling compounds to decrease friction when pulling conductors and cables.

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

A. Service entrance grounding system per detail on drawing.

B. Connect enclosures, exposed non-current carrying metal parts of electrical equipment, metal raceway systems, grounding conductors in raceways and cables, receptacle ground connectors, and plumbing systems to ground with copper conductors sized in accordance with NEC table 250-95.

C. All electrical systems shall be suitably grounded in accordance with code requirements.

D. All connections shall be made with UL approved connectors installed in accordance with UL guidelines. All contact surfaces shall be thoroughly cleaned and bright before connections are made.

E. Provide a green insulated grounding conductor sized per NEC table 250-95 in all raceways and cables where the conductor overcurrent protection is 15 amperes or larger.

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

A. Provide the type of anchors and/or fasteners (size and material) recommended by the equipment manufacturer and required by the NEC.

B. Comply with the National Electrical Contractors Association's (NECA) "Standard of Installation" pertaining to anchors, fasteners, hangers, supports, and equipment mounting.

C. Comply with Federal Specification FF-S-760 pertaining to retaining straps for conduit, pipe, and cable.

D. Provide products listed and classified by UL as suitable for the installation conditions.
E. In no case shall items be supported by nylon ties, wood, tape, tie wire, or perforated straps.

SECTION 260533 - RACEWAYS

A. Provide continuous metallic raceway for all conductors.

B. Conduit shall be electrical metallic tubing (EMT) 3/4" trade size minimum or as otherwise shown or required by the NEC.
   1. Exceptions: Provide Sealite flexible metallic raceway for connection to motors, control devices and other electrically operated equipment which is subject to vibration.

C. Underground conduits to be Schedule 40 PVC.

D. All raceways shall be UL approved for intended usage and each length delivered to the project site shall bear UL manufacturer's label.

SECTION 260534 - CABINETS, BOXES, AND FITTINGS

A. Outlet boxes shall be metallic and of such form and dimension as to be best adapted to their specific location. Use the number, size, and arrangement of conduits connecting to them.

B. Pull boxes and junction boxes as well as enclosures for safety switches, controls, panelboards, and other enclosed electrical equipment shall be constructed of galvanized steel in accordance with NEC requirements, and shall bear a NEMA rating suitable for installation conditions.

SECTION 260535 - ELECTRICAL CONNECTIONS FOR EQUIPMENT

A. Manufacturers: Subject to compliance with requirements, provide circuit and motor disconnects of one of the following:
   1. Square D Company
   2. Siemens
   3. Cutler-Hammer Inc.
   4. General Electric

B. Provide surface-mounted, heavy-duty type, sheet-steel enclosed safety switches of types, sizes and electrical characteristics indicated on the drawings. Switches shall be quick-make, quick-break type, so that switch blades are visible in OFF position with door open. Equip with operating handle which is integral part of enclosure base and whose operating position is easily recognizable and is pad-lockable in OFF position; construct current carrying parts of 98% conductivity copper, and silver-tungsten type switch contacts; and positive pressure type reinforced fuse clips. Provide NEMA 1 enclosures for indoor dry locations. Provide NEMA Type 3R enclosures with rain-tight hubs for outdoor or indoor damp/wet locations. For motor and motor starter disconnects, provide units with horsepower ratings suitable to the loads.

SECTION 260573 - OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY
A. Provide a complete electrical distribution coordination study, prepared by the distribution equipment Manufacturer and based on the equipment being submitted. Submit complete documentation of the coordination of all circuit breakers and fused switches. The Manufacturer shall provide recommendations for the settings of all adjustable devices (i.e. ground fault, adjustable breakers) to provide maximum coordination and selectivity. This report shall include a composite drawing for each segment of the distribution system showing the time-current curves of all devices, with the devices set as recommended. This shall include the complete characteristic curves for all circuit protection devices.

B. Provide a complete short circuit analysis prepared by the distribution equipment Manufacturer and based on the actual equipment and conductor lengths provided by the Contractor.

C. Provide a complete shock hazard and flash hazard analysis prepared by the distribution equipment Manufacturer and based on the actual equipment and conductor lengths provided by the Contractor. Provide for all warning signs and classification signage on all distribution equipment as required by NFPA 70E, 2008 Edition.

SECTION 260943 - NETWORK LIGHTING CONTROLS

A. Provide programmable low voltage lighting control equipment as shown on Drawings, Scheduled, and as specified herein from the following manufacturer’s:

1. Wattstopper DLM
2. Sensor Switch nLight

B. Components shall include:

1. Automation appliance building management system interface
2. Low voltage switches
3. Occupancy sensors
4. Relay control packs

C. Manufacturer shall provide a factory authorized technician to confirm proper installation and operation of all system components. The startup requirement is intended to verify that all occupancy sensors are located, installed, and adjusted as intended by the factory and the contract documents.

SECTION 261900 - DIGITAL, ADDRESSABLE FIRE ALARM SYSTEM

A. System to be a fully addressable, Class "A", Style 7, supervised with internal battery back-up and connection to emergency power.

B. System shall be as manufactured by Siemens/Cerberus or approved equal of Edwards and Simplex. Provide type MXL fire alarm control panels with LCD display units. Provide FirePrint intelligent fire detectors for all smoke, fire, duct, and heat detectors in the building.

C. Provide remote test/indicators for all duct detectors.

D. Provide 20 spare detectors, and 3 spares for every other type of device used on the system.
E. Upon completion of the fire alarm system extension test all components of the system to insure proper operation of individual components and the complete system. Obtain written verification of satisfactory completion of testing from the manufacturer’s representative.

F. Wiring shall be MC cable approved for fire alarm use.

G. Installation shall be in accordance with fire alarm system manufacturer’s directions.

H. Testing, Acceptances and Certifications, as required by applicable codes and as directed by system manufacturer.

SECTION 262413 - SWITCHBOARD

A. General Construction: Furnish and install where indicated a dead front type, completely metal enclosed, self-supporting structure independent of wall supports. Voltage rating shall be as indicated on the drawings. It shall consist of the required number of vertical sections bolted together to form one rigid switchboard 90 3/8” high. The sides and rear shall be covered with removable screw-on plates. All edges of front covers or hinged front panels shall be formed. Switchboard shall be front accessible only. Switchboard shall be as manufactured by Square D, Eaton, or Siemens.

B. The switchboard bus short circuit shall be 100,000 amperes RMS symmetrical.

C. Equipment shall comply with the latest applicable standards of NEMA, ANSI and U.L.

D. Bus Bars:
   1. Phase, neutral and ground busses shall be hard drawn copper of 98 percent conductivity.
   2. Phase bus bars: Provide with ratings as shown on drawings.
   3. Neutral Bus Bar: Provide with the same rating as the phase bus bars. Bond to grounding electrode.
   4. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors. A ground bus and lugs shall be furnished firmly secured to each vertical section structure and shall extend the entire length of the switchboard. Bond to grounding electrode.
   5. All bus work shall be rated to withstand maximum short-circuit stresses when connected to a supply system having fault capacity of 65k amps RMS symmetrical at rated voltage.
   6. Main horizontal bus bars shall be mounted with all three phases arranged in the same vertical plane.

E. Main, Neutral, and Ground Lugs:
   1. All lugs shall be compression type suitable for copper cable of sizes indicated on the drawings.

F. All hardware used on conductors shall be high-tensile strength and zinc plated. All terminals shall be of the anti-turn solderless type suitable for copper cable of sizes indicated.

G. Switchboard Type (Front Accessible Panel-Mounted): Switchboard shall be Square D type QED-2. All vertical sections shall align front and rear with uniform depth. Provide 4” housekeeping pad under switchboard.

H. All internal devices shall be removable from the front and shall be panel mounted with the necessary line and load connections front accessible.

I. Switchboard shall have integral TVSS.
J. Customer Metering: Provide a separate customer metering compartment with front hinged door and include the following:

1. 3-Current transformers ampacity to match that of the main device.
2. 3-Potential transformers.
3. 1-Digital meter, Square D CM2350 with RS-232 communication port.

K. Main Disconnect:

1. Main disconnect shall be a insulated case circuit breaker with programmable electronic trip unit, and ground fault and single phase protection.

L. Feeder Disconnect Breakers:

1. Feeder protective devices shall be of the stationary mounted, molded case, current limiting circuit breakers with ground fault interruption and adjustable trip settings.
2. Breakers and terminals shall have a UL 60/75°C rating.

SECTION 262416 - PANELBOARDS

A. Panelboards shall be as manufactured by Square D, Eaton, Siemens or General Electric.

B. Panelboard enclosures shall be NEMA PB 1; Type 1, 6 inches deep and 20 inches wide, unless noted otherwise.

C. Panelboards shall have copper bus. Provide integral copper ground bus bonded to the panelboard enclosure.

D. Integrated short circuit rating shall be a minimum of 10,000 amperes RMS symmetrical.

E. Molded case circuit breakers shall be FS W-C-375, bolt-on type, with thermal magnetic trip operation and a common trip handle for all poles. 1" minimum pole spacing.

F. Branch circuit breakers shall be rated 20 amperes or larger where indicated.

G. Install panelboards only at locations which are in compliance with NEC Article 384-4.

H. The system of feeder and branch circuits shall be connected to panelboard busses in such a manner that the connected loads will be balanced on all phases as closely as practicable. Should there be a sizable unbalanced condition on any part of the electrical system make changes to achieve optimum balance.

SECTION 262726 - WIRING DEVICES

A. Wall switches to control lighting shall be 20 ampere, 120 volts, unless noted otherwise.

B. Duplex convenience receptacles shall be 20 ampere, 125 volt, 3 wire.

C. Receptacles located within 72" of lavatories or sinks or elsewhere required by code shall be ground fault interrupter type.

D. Device plates shall be stainless steel.
E. Provide wiring devices in accord with National Electrical Code Article 210 requirements.

SECTION 262813 - FUSES

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

1. Bussmann Division, Cooper Industries, Inc.
2. Shawmut Division; Gould Inc.
3. Littlefuse, Inc.

B. Application of Fuses

1. Fusible Switches: Apply the following class and types:
   a. 30-600 Amperes: Class RK1, time delay.
   b. 601-1,200 Amperes, Motor, or Transformer Circuit: Class L, time delay.

2. Service Protectors: Class L, time delay.
3. Combination Starters: Class RK1, time delay.

SECTION 263213 - ENGINE GENERATOR

A. Provide a natural gas generator with 480Y/277V system voltage, and as hereby defined to include, but not by way of limitation, electric generator, engine starting system including batteries, instrument control panel, transfer switches, exhaust silencer, wall thimble, 24 hour sub-base tank, and accessories. Generator shall be as manufactured by Cummins, Kohler, Caterpillar or Generac.

B. Concrete and grout for engine-driven generator pad, foundations, frames, and bedplates as specified in Division 3 CONCRETE sections.

C. Weatherproof, sound attenuated enclosure.

D. Vibration control for engine-driven generator units including, pads, springs, rails, bases, hangers, and connectors shall be as recommended by the generator manufacturer for vibration control and isolation.

E. Piping and associated accessories required for fuel system.

F. Wires/cables, electrical boxes and fittings that are required in conjunction with the engine-generator work.

G. Upon completion of the emergency power system wiring obtain the services of a factory trained technician or engineer employed by the manufacturer of the engine generator set to technically supervise and participate in the testing and required adjustments of the emergency power system. Test all components of the system to insure proper operation of individual components and the complete system. Obtain written verification of satisfactory completion of testing from the manufacturer's representative.

SECTION 263600 - TRANSFER SWITCHES

A. Provide automatic transfer switch with number of poles, amperage, voltage, withstand and close-on ratings as shown on the plans. Each automatic transfer switch shall consist of an inherently double throw power transfer switch and a microprocessor controller to provide automatic operation.
B. The transfer switch shall be electrically operated and mechanically held. The electrical operator shall be a momentarily energized, single-solenoid mechanism. Main operators that include overcurrent disconnect devices, linear motors or gears shall not be acceptable. The switch shall be mechanically interlocked to ensure only two possible positions, normal or emergency.

C. The controller’s sensing and logic shall be provided by a single built-in microprocessor for maximum reliability, minimum maintenance and the ability to communicate serially though an optional serial communication module.

D. Manufacturer: Subject to compliance with requirements, provide automatic transfer switches of Cummins, Kohler, or Generac.

SECTION 265100 - INTERIOR LIGHTING

A. Provide all fixtures as described in Narrative including all lamps, ballasts and accessories as required for a complete and operational lighting system. Provide all labor and materials necessary to assemble, install, and test the specified equipment in the manner indicated.

B. Fixtures and/or fixture outlet boxes shall be provided with hangers to adequately support the complete weight of the fixture. Design of the hangers and method of fastening shall be submitted to the Architect for review and approval prior to installation.

C. LED Lamps:

1. Codes and Standards:
   a. LED luminaires must meet the following:
      1) LM-79: Approved Method for Electrical and Photometric Measurement of SSL Products
      2) LM-80: Approved Method for Measuring Lumen Maintenance of LED Light Sources
      3) L-70: 70% Lumen Maintenance
      4) TM-21: Establishes a method for projecting lumen maintenance
      5) (and useful lifetime) of LED light sources from available LM-80 data

   2. Lighting Facts must be provided in the lighting submittal for each LED fixture type.
   3. Individual LEDs shall be connected such that a catastrophic loss or the failure of one LED will not result in the loss of the entire luminaire.
   4. LED light engine shall be suitable for field maintenance or service from below the ceiling with plug-in connectors. LED light engine shall be upgradable.
   5. The thermal management (of the heat generated by the LEDs) shall be of sufficient capacity to assure proper operation of the luminaire over the expected useful life.
   6. LED’s in the fixtures must be within (3) MacAdam ellipses
   7. Color Temperature:
      a. 2700K (Range of 2500K-3000K)
      b. 3500K (Range of 3100K-3700K)
      c. 4000K (Range of 3800K-4400K)

   8. Drivers must be 0-10v standard.
SECTION 265600 - EXTERIOR LIGHTING

A. Fixtures to utilize LED source and electronic ballasts.

B. Lighting shall be controlled through networked lighting control relay packs.

C. Provide exterior emergency egress lighting as required by applicable codes and regulations.

SECTION 271300 - FIBER OPTIC CABLING SYSTEMS

A. 50μm Multi-mode

1. FO Cables: low-loss, glass type, fiber-optic multimode graded-index cables with the following operational and construction features:

   1. Core diameter: 50.0 microns.
   2. Cladding diameter: 125 microns.
   4. Maximum attenuation: 3.0dB @ 850 nm/1.0dB @ 1300nm.
   5. Minimum bandwidth: 400 MHz-km.
   6. Minimum length: 500 meters @ 850nm/500 meters @ 1300nm.
   7. Numerical aperture: 0.2 (nominal).
   8. Maximum installation load: As per manufacturer’s specifications.
   9. Maximum operational load: As per manufacturer’s specifications.
   10. Minimum bend radius (unloaded): As per manufacturer’s specifications.
   11. Operating temperature range: -60° to +85°C.

2. FO cables shall be plenum or non-plenum rated, indoor or outdoor rated as indicated on the Drawings and as specified in other section of the Specifications.

3. FO Connectors: Provide FC style multi-mode connector as per drawings. Mated pair insertion loss shall be less than 0.75 dB. Connector shall accept both 250 and 900-micron fiber coatings.

4. Manufacturer/Model Number: Provide cable manufactured by one of the following companies:

   1. ADC cable, equal to below.
   2. Belden Cable, model number PTD5 series (riser cable) or PTDP5 series (plenum).
   3. Berk-Tek cable, equal to above.
   4. SYSTIMAX SCS, model number Lazrspeed 300.
   5. Tyco Electronics, AMP Netconnect, equal to above.
   6. General Cable Corporation, equal to above.

B. Single-mode FO Cable

1. FO Cables: low-loss, glass type, fiber-optic single mode graded-index cables with the following operational and construction features:

   1. Core diameter: 9 microns.
   2. Cladding diameter: 125 microns.
   4. Maximum attenuation: 0.6dB @ 1300nm / 0.5db @ 1550nm.
   5. Minimum bandwidth: unlimited
7. Maximum installation load: As per manufacturer’s specifications.
8. Maximum operational load: As per manufacturer’s specifications.
9. Minimum bend radius (unloaded): As per manufacturer’s specifications.
10. Operating temperature range: -60° to +85°C.

2. FO cables shall be suitable for 10Gigabit Ethernet (10GbaseF) use.
3. FO cables shall be plenum or non-plenum rated, indoor or outdoor rated as indicated on the Drawings and as specified in other section of the Specifications.
4. FO Connectors: Provide SC style single-mode connectors. Mated pair insertion loss shall be less than 0.75 dB. Connector shall accept both 250 and 900-micron fiber coatings.
5. Manufacturer/Model Number: Provide cable manufactured by one of the following companies:

   1. ADC cable, equal to below.
   2. Belden Cable, model number PTD1 series (riser cable) or PTDP1 series (plenum).
   3. Berk-Tek cable, equal to above.
   4. SYSTIMAX SCS, equal to above.
   5. Tyco Electronics, AMP Netconnect, equal to above.
   6. General Cable Corporation, equal to above.

SECTION 271000 - STRUCTURED COMMUNICATIONS CABLES

A. Category 6 Voice/Data UTP Cable

   1. Provide where indicated on the Drawings or where required by the Specifications, TIA/EIA Category 6 unshielded twisted pair cable.
   2. Provide plenum rated cable in all areas having plenum rated ceiling. All areas of the building shall be considered as having plenum rated ceiling unless noted otherwise on the Drawings.
   3. Category 6 UTP cable shall meet the following requirements:

          1. Structured cabling system shall support 1GB Ethernet.
          2. All cables shall have 4-pairs.
          3. All Category 6 cables shall meet the minimum requirements of the TIA/EIA-568C and all addenda ratified thereafter.
          4. All cables shall be tested by ETL, or UL, or an equal third-party testing organization as approved by the Engineer. All cables shall be third-party tested using a standard TIA/EIA 4-connector channel test. Provide printed test reports from the third-party testing organization with the Submittals indicating the following minimum performance requirements:

<table>
<thead>
<tr>
<th>Test</th>
<th>Statistics</th>
<th>Frequency (MHz)</th>
<th>Channel</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACR</td>
<td>Minimum</td>
<td>200</td>
<td>3.3</td>
<td>(6)</td>
</tr>
<tr>
<td>ACR</td>
<td>Typical</td>
<td>200</td>
<td>N/A</td>
<td>(6)</td>
</tr>
<tr>
<td>PS ACR</td>
<td>Minimum</td>
<td>100</td>
<td>15.8</td>
<td>(6)</td>
</tr>
<tr>
<td>PS ACR</td>
<td>Typical</td>
<td>100</td>
<td>N/A</td>
<td>(6)</td>
</tr>
<tr>
<td>PS ACR</td>
<td>Minimum</td>
<td>200</td>
<td>0.3</td>
<td>(6)</td>
</tr>
<tr>
<td>PS ACR</td>
<td>Typical</td>
<td>200</td>
<td>N/A</td>
<td>(6)</td>
</tr>
</tbody>
</table>

1) TIA/EIA standard test
2) minimum means worst-case value, typical means average value
3) test frequency  
4) 100 meter channel test results  
5) 90 meter link test results  
6) submit values for Link test

4. Manufacturer/Model Number: Provide cable manufactured by one of the following companies:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Series</th>
<th>Plenum (CMP)</th>
<th>Riser (CMR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADC/Krone</td>
<td>TrueNet</td>
<td>6SP-xx</td>
<td>6SR-xx</td>
</tr>
<tr>
<td>Belden</td>
<td>Media Twist</td>
<td>1874A series</td>
<td>1872A series</td>
</tr>
<tr>
<td>Berk-Tek</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Cable Corporation</td>
<td>GenSpeed 6000</td>
<td>7131688 (*)</td>
<td>7133707 (*)</td>
</tr>
<tr>
<td>SYSTIMAX SCS</td>
<td>GigaSPEED XL</td>
<td>2071 series</td>
<td>1071 series</td>
</tr>
<tr>
<td>Tyco Electronics/AMP</td>
<td>2195 series</td>
<td>219567 series</td>
<td>219560 series</td>
</tr>
</tbody>
</table>

(*) model number if for blue cable, use model number for required color cable.

5. Jacks and Patch Panels:

1. All jacks shall be RJ-45, 568B configuration.
2. Patch Panel shall be in 24 or 48-port configuration as required by the number of workstation cables.
3. Manufacturer/Model Number: Provide jacks and patch panels manufactured by one of the following companies:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Series</th>
<th>Jacks</th>
<th>Patch Panels</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADC/Krone</td>
<td>TrueNet</td>
<td>6830-1-830-xx</td>
<td>6653-1-677-xx</td>
</tr>
<tr>
<td>Hubbell</td>
<td>HXJ6 series</td>
<td></td>
<td>P6xxUE series</td>
</tr>
<tr>
<td>Ortronics</td>
<td>Solution 6</td>
<td>MX6 series</td>
<td>HD6 series</td>
</tr>
<tr>
<td>SYSTIMAX SCS</td>
<td></td>
<td>equal to above</td>
<td>equal to above</td>
</tr>
<tr>
<td>Tyco Electronics/AMP</td>
<td>1375055-X</td>
<td></td>
<td>137501X-1</td>
</tr>
</tbody>
</table>

SECTION 275113 – PAGING SYSTEM

A. Provide an IP based overhead paging system. Notification shall be made via any VoIP phone in the district. Provide all servers and related software and licensing for complete system operation.

SECTION 281300 - ACCESS CONTROL SYSTEM

A. Provide an access control system for entry points designated by the Owner. System shall consist of: key fob entry device mounted in door frame at required entry points with electrified hardware, by GC, at these doors; power to panic bar; remote release of doors from the main dispatch; and door processing units.

B. Mount door processing units above the accessible ceiling near doors served by equipment. Provide a 120 volt power connection to these units. Provide cabling routed above the accessible ceilings to connect all door processing units in building to build a network for access control system. System shall be given a static IP address for control of system on building network.
C. System shall be manufactured by Linel OnGaurd, Mercury Security Hardware or approved equivalent.

SECTION 281300 – AUDIO/VIDEO INTERCOM SYSTEM

A. Contractor shall provide and install a complete audio/video intercom system, providing all hardware, software, brackets, and equipment as shown on the Drawings or required for a complete functional system.

B. The requirements of this project consist of two (2) master station which shall control access to two (2) entry locations. These locations shall have a door access unit which shall contain a video component, an audio component, and card access reader unit.

C. The “outside” units shall be surface mounted.

D. The inside station shall be hands free with video and pushbutton for activating the door strike or magnetic door lock.

E. The system shall be manufactured by Aiphone or approved equivalent.

SECTION 282300 - VIDEO SURVEILLANCE

A. For interior locations, provide ceiling mounted closed circuit television (CCTV) cameras, Samsung QND-7010R color camera with lens, power supplies, and cabling.

B. For outdoor locations, provide Samsung XNV-8080R camera with motorized lens, power supplies, and cabling.

C. A network video storage server shall be provided to hold recorded video for a minimum of 30 days.

END OF OUTLINE SPECIFICATION