

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
- B. Related Requirements:
 - 1. Section 312000 "Earth Moving" for drainage fill under slabs-on-grade.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete mixture.
- C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement.

1.3 INFORMATIONAL SUBMITTALS

- A. Material certificates.
- B. Material test reports.
- C. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer, detailing fabrication, assembly, and support of formwork.
- D. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1.5 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete mixtures.

1.6 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 306.1.
 - 1. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B. Hot-Weather Placement: Comply with ACI 301.

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.

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.
- 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.

2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Galvanized Reinforcing Bars: ASTM A 767/A 767M, Class I or Class II zinc coated after fabrication and bending.
- C. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.
- D. Deformed-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, flat sheet.
- E. Galvanized-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from galvanized-steel wire into flat sheets.

- F. 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."

2.4 CONCRETE MATERIALS

- A. Cementitious Materials:
 - 1. Portland Cement: ASTM C 150/C 150M, Type I/II.
- B. Normal-Weight Aggregates: ASTM C 33/C 33M, graded.
 - 1. Maximum Coarse-Aggregate Size: 3/4-inch nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Lightweight Aggregate: ASTM C 330/C 330M, 3/8-inch nominal maximum aggregate size.
- 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. Water: ASTM C 94/C 94M and potable.

2.5 FIBER REINFORCEMENT

- A. Synthetic Micro-Fiber: Monofilament or fibrillated polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, 1/2 to 1-1/2 inches long.

2.6 VAPOR RETARDERS

- A. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.

2.7 CURING MATERIALS

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

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

2.8 RELATED MATERIALS

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

2.9 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.
- B. Cementitious Materials: Use fly ash, pozzolan, slag cement, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
- C. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

2.10 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Proportional Normal-Weight Concrete mixture:
 - 1. Minimum Compressive Strength: As indicated at 28 days.
 - 2. Maximum W/C Ratio: as recommended.
 - 3. Slump Limit: 4 inches
 - 4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch nominal maximum aggregate size.
 - 5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
 - 6. Synthetic Micro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate.

B. Proportional structural Lightweight concrete mixture:

1. Minimum Compressive Strength: 3000 psi at 28 days.
2. Calculated Equilibrium Unit Weight: as determined by ASTM C 567/C 567M.
3. Slump Limit: 5 inches, plus or minus 1 inch.
4. Air Content: 7 percent, plus or minus 2 percent at point of delivery for nominal maximum aggregate size 3/8 inch or less.
5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
6. Synthetic Micro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate.

2.11 FABRICATING REINFORCEMENT

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

2.12 CONCRETE MIXING

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

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Chamfer exterior corners and edges of permanently exposed concrete.

3.2 EMBEDDED ITEM INSTALLATION

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

3.3 VAPOR-RETARDER INSTALLATION

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.4 STEEL REINFORCEMENT INSTALLATION

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.
- B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

- C. Cold-Weather Placement: Comply with ACI 306.1.
- D. Hot-Weather Placement: Comply with ACI 301.

3.7 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces exposed to public view and to receive a rubbed finish.
- C. Rubbed Finish: Apply the following to smooth-formed-finished as-cast concrete where indicated:
 - 1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
 - 2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix 1 part portland cement to 1-1/2 parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surfaces to receive trowel finish.

- C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighthen until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Apply a trowel finish to surfaces be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 - 2. Finish and measure surface, so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft.-long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch.
- D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom.
 - 1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.9 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.
- D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 CONCRETE SURFACE REPAIRS

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

3.11 FIELD QUALITY CONTROL

- A. Testing and Inspections: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
 1. Testing services: Tests shall be performed according to ACI 301.

END OF SECTION 033000

SECTION 05500 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following metal fabrications to be furnished and installed.
- B. Schedule of items furnished and installed.
 - 1. Miscellaneous metals and metal fabrications required for installation of General Contractor's work including steel plates, bars, pipe, tube, slotted metal furring, etc.
 - 2. Thresholds: Abrasive thresholds @ intersections of wood, synthetic and other floor materials.
 - 3. Lintels and shelf angles attached to steel framing.
 - 4. Loose lintels.
 - a. Loose steel lintels are to be furnished and installed over all mechanical and architectural openings. Refer to mechanical and architectural drawings for opening sizes and locations.
 - 5. Roof opening steel angle frames for roof top HVAC equipment. Coordinate exact location and dimensions with HVAC Sub-Contractor.
 - 6. Loose bearing and leveling plates.

1.3 SUBMITTALS

- A. Product Data: Submit manufacture's specifications, anchor details and installation instructions for fabricated metal products furnished under this section.
- B. Shop Drawings: Detail fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
 - 1. Loose Lintel Shop Drawings: Submit shop drawings for loose lintels, including loose lintel schedule, separately. Indicate size, dimension, configuration, weight, and location for each lintel.
 - 2. Where material or fabrications are indicated to comply with specific design load requirements, include structural calculations, material properties and their information needed for structural analysis.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Welding: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1, "Structural Welding Code--Steel."
 - 2. AWS D1.2, "Structural Welding Code--Aluminum."
 - 3. AWS D1.3, "Structural Welding Code--Sheet Steel."
 - 4. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

1.6 COORDINATION

- A. Coordinate installation of anchorages for metal fabrications with other Contractors' work as necessary. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: For metal fabrications 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.

2.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500.

- 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 flange edges returned toward web and with 9/16-inch- wide slotted holes in webs at 2 inches o.c.
 - 1. Depth and gage of Channels: As indicated.
 - 2. Metal and Thickness: Galvanized steel complying with ASTM A 653/A 653M, structural quality, Grade 33, with G90 coating; 0.108-inch nominal thickness.
 - 3. Finish: Hot-dip galvanized after fabrication.
- E. Malleable-Iron Castings: ASTM A 47, Grade 32510.
- F. Gray-Iron Castings: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.
- G. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.
- H. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.3 ALUMINUM

- A. Aluminum Extrusions: ASTM B 221, alloy 6063-T6.

2.4 PAINT

- A. Shop Primers: Provide primers that comply with Division 9 Section "Painting."
- B. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

2.5 FASTENERS

- A. General: Provide Type 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, where built into exterior walls. Select fasteners for type, grade, and class required.
- B. 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.

- D. Machine Screws: ASME B18.6.3.
- E. Lag Bolts: ASME B18.2.1.
- F. Wood Screws: Flat head, carbon steel, ASME B18.6.1.
- G. Plain Washers: Round, carbon steel, ASME B18.22.1.
- H. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1.
- I. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry 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. Material: Alloy Group 1 or 2 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.
- J. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as needed.

2.6 GROUT

- A. 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.

2.7 CONCRETE FILL

- A. Concrete Materials and Properties: Comply with requirements in Division 3 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.
- B. All Concrete fill shall be supplied and installed by General Contractor for metal fabrications installed by General Contractor and all other Contractors.

2.8 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Shear and punch metals cleanly and accurately. Remove burrs.
- C. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. 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.
- E. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- F. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- G. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.
- H. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- I. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

2.9 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.

2.10 LOOSE STEEL LINTELS

- A. Fabricate loose structural-steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
- B. Weld adjoining members together to form a single unit where indicated.
- C. Size loose lintels to provide bearing length at each side of openings equal to one-twelfth of clear span, but not less than 8 inches, unless otherwise indicated.
- D. Galvanize loose steel lintels located in exterior walls.
- E. Painting: Refer to Division 9 Section "Painting".

2.11 MISCELLANEOUS FRAMING AND SUPPORTS

- A. Fabricate units from structural-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.

- B. Galvanize miscellaneous framing and supports in the following locations:
 - 1. Exterior.
 - 2. Interior where indicated.

2.12 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from structural-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. Provide anchors, welded to trim, for embedding in concrete or masonry construction, spaced not more than 6 inches from each end, 6 inches from corners, and 24 inches o.c., unless otherwise indicated.
- C. Galvanize miscellaneous steel trim in the following locations:
 - 1. Exterior.
 - 2. Interior, where indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- E. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.

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

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

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

3.3 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05500

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof curbs, cants and roof expansion joint assemblies.
2. Blocking, furring and grounds.
3. Gypsum sheathing.
4. Electrical panel back boards.
5. Wood preservative and fire retardant treatment.

B. Related Sections include but are not limited to:

1. Section 05 40 00 Cold Formed Metal Framing.
2. Section 09 29 00 Gypsum Board.

1.2 SUBMITTALS

A. Product Data:

1. Provide technical data wood treatment.

B. Manufacturer's Certificate:

1. Certify that Products conform to specified requirements.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with the following agencies:

1. Lumber Grading Agency: Certified by ALSC.
2. Plywood Grading Agency: Certified by APA.

PART 2 - PRODUCTS

2.1 LUMBER MATERIALS

- A. Framing Lumber: Stress grade rated, Number 2 or better Hem-Fir, Douglas Fir, or Southern Pine, surfaced four sides; 19 percent maximum moisture content.
- B. Treated Lumber: Stress grade rated, Number 2 Southern Pine, surfaced four sides; 19 percent maximum moisture content after treatment.

2.2 SHEATHING MATERIALS

- A. Plywood Sheathing: APA Rated Sheathing Structural I.; Exposure Durability 1; sanded.
- B. Gypsum Board Wall Sheathing: ASTM C1177; 5/8 inch thick

1. Specification Section 09 29 00 - Gypsum Board.

C. Telephone and Electrical Panel Boards: Plywood.

2.3 ACCESSORIES

A. Fasteners: Galvanized steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrate conditions are ready to receive blocking, curbing and framing.

3.2 PREPARATION

A. Coordinate placement of blocking, curbing and framing items with partition and roof construction.

B. Coordinate curb installation with installation of decking and support of deck openings, roofing vapor retardant and parapet construction.

3.3 INSTALLATION

A. Erect wood framing and sheathing members in accordance with applicable code. Place members level and plumb. Place horizontal members crown side up.

B. Curb all roof openings except where curbs are provided. Construct curb members of single pieces per side. Form corners by alternating lapping side members.

C. Install framing 16 inches on center if indicated on drawings.

D. Install furring horizontally; space maximum 16 inches on center, not more than 4 inches from floor and ceiling lines.

E. Install blocking where required to support fixtures, casework and fittings attached to framed wall and ceiling construction.

F. Secure sheathing to framing members with ends over firm bearing and staggered.

G. Install telephone and electrical panel back boards with plywood sheathing material where required. Size the back board by 12 inches beyond size of electrical panel, paint finished in black color.

END OF SECTION 06 10 00

SECTION 07 21 00 - BUILDING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Batt insulation in exterior wall construction.
 - 2. Sound attenuation insulation in interior walls and ceilings
- B. Related sections include but are not limited to:
 - 1. Section 09 29 00 – Gypsum Board.
 - 2. Section 09 22 16 – Non-Structural Metal Framing

1.2 SUBMITTALS

- A. Product Data:
 - 1. Submit data on product characteristics, performance criteria, and limitations.
- B. Manufacturer's Installation Instructions:
 - 1. Submit special environmental conditions required for installation and installation techniques.
- C. Manufacturer's Certificate:
 - 1. Certify that products meet or exceed specified requirements.

1.3 ENVIRONMENTAL REQUIREMENTS

- A. Do not install adhesives when temperature or weather conditions are detrimental to successful installation.

1.5 COORDINATION

- A. Coordinate the Work with Section 07 25 00 for installation of vapor retarder and air seal materials.

PART 2 - PRODUCTS

2.1 BATT INSULATION

- A. Manufacturers: Provide one of the following:
 - 1. Owens Corning; Thermal Spread 25 Insulation.
 - 2. Certainteed; Flame-Resistant Foil Insulation (FSK-25).
 - 3. Manville; FSK-25 Fiber Glass Thermal Insulation.
 - 4. Knauf Fiber Glass; FSK-25 Batt Insulation.
 - 5. Or approved equal.
- B. Batt Insulation (Type 1): ASTM C665, Type III, Class A preformed glass fiber batt type, fire resistant foil reinforced Kraft faced one side, with maximum flame/smoke properties of 25/450 in

accordance with ASTM E84.

- C. Thermal Resistance: Indicated on Drawings; 6-inches thick, R-19; 8½ - 9-inches thick, R-30, etc.
- D. Batt Size: Friction fit of sizes to fit stud spacings.

2.2 FIRESAFING BATT INSULATION

- A. Manufacturers: Provide one of the following:
 - 1. United States Gypsum Company; Thermafiber Sound Attenuation Fire Blankets (SAFB).
 - 2. Or approved equal.
- B. Batt Insulation (Type 2): ASTM C665, Type I, unfaced semi rigid mineral fiber batt type, 2.5 pcf density, 3 inches thick, with maximum flame/smoke properties of 15 /0 in accordance with ASTM E84.
- C. Batt Size: Friction fit of sizes to fit stud spacings.

2.3 THERMAFIBER SOUND INSULATION

- A. Thermafiber insulation: A mineral fiber product (ASTM C-665) ideal for improving sound control in partition and floor/ceiling assemblies. Use thickness on drawings or manufacturer recommendation. Use formaldehyde free batts. Sound Attenuation Fire Blankets (SAFB): Paperless semi-rigid mineral fiber mats designed to improve STC ratings when installed in steel stud partitions and wood frame construction. Fire safety FS-15 blankets are used to provide non-combustible exterior wall furring and steel stud curtain wall assemblies. They are open faced and require separate vapor retarder. Use thickness indicated / as per manufacturer's recommendations

2.4 ACCESSORIES

- A. Adhesive for Cavity Wall Insulation: Type recommended by insulation manufacturer for application.
- B. Adhesive at Other Locations: Type recommended by insulation manufacturer for application.
- C. Tape: Bright aluminum self-adhering type for foil faced insulation.
- D. Wood Blocking: Preservative treated wood blocking as specified in Section 06 10 00.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive.
- B. Verify substrate surface is flat, free of honeycomb, fins, irregularities, materials or substances that may impede adhesive bond.

3.2 INSTALLATION - BATT INSULATION

- B. Install in exterior walls, roof and ceiling spaces without gaps or voids. Fluff insulation to full thickness for code compliant R-value before installation. Do not compress insulation.

- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation.
- E. Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
- F. Tape in place.
- G. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
- H. Metal Framing: Place vapor retarder on warm side of insulation; lap and seal sheet retarder joints over member face.
- I. Extend vapor retarder tight to full perimeter of adjacent window and door frames and other items interrupting the plane of membrane. Tape seal in place.

3.3 INSTALLATION - NAILABLE INSULATION

- A. Install insulation with mechanical fasteners in accordance with insulation manufacturer's instructions.
- B. Install wood blocking continuous along eave and rake . Use thickness equal to nailable roof insulation.
- C. Install nailable roof insulation with long dimension parallel to roof rake with joints staggered. Fasten insulation with mechanical insulation fasteners.
- D. Maintain minimum 1 inch wide clear opening between sheathing along full length of ridges.
- E. Maintain minimum 1 inch wide clear opening between sheathing along upper one-half of hips. Install sheathing tight along lower one-half of hips.
- F. Fasten insulation with mechanical insulation fasteners to meet uplift performance requirements. Arrange fasteners in uniform pattern to present a neat appearance on exposed to view surface of structural deck.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

- A. Do not permit work to be damaged prior to covering insulation.

END OF SECTION 07 21 00

SECTION 07 53 23 – EPDM ROOFING - ADHERED

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Applying EPDM membrane fully adhered over GMGB and flat and tapered isocyanurate insulation, all mechanically attached. Use flat insulation on low-sloped metal decks and tapered insulation on flat metal decks.
- B. GMGB mechanically attached to steel deck and covered with a self-adhering vapor retarder
- C. EPDM flashing at walls, parapets, penetrations, terminations and curbs
- D. Wood blocking and nailers.

1.2 RELATED SECTIONS

- A. Section 07 62 00: Sheet Metal Flashing and Trim
- B. Section 07 71 00: Roof Specialties

1.3 QUALITY ASSURANCE

- A. All work under this Section shall be performed by a single firm with a minimum of five (5) years' experience in the installation of the specified type of roofing. Such firm shall submit with their bid, satisfactory evidence that the companies issuing the Warranties required in paragraph I have licensed or approved them as an applicator on this Project together with a list of similar completed projects listing name, date, location and phone numbers.
- B. Submit certification that the foremen or crew chief and at least one other member of the roofing crew have installed three or more similar membranes and are familiar with the system, have completed a formal instructional or training program for the installation of the specified system or a have a certificate issued by a vocational training school or national roofing manufacturer of an equivalent training program or have had five years of practical experience in the system (list names of at least three buildings and year of completion).
- C. Representatives of companies issuing Warranties shall have reviewed the Contract drawings and specifications, inspected at least one day's installation and made an inspection of the completed roof to assure acceptability.
- D. Prior to starting work, furnish certificates from manufacturers of membrane and insulation stating that materials to be furnished will comply with the standards specified (including ASTM, U.L. and F.M.) and that all materials in the system are physically and chemically compatible.

- E. All materials shall be in manufacturer's unopened packages, wrappings or containers, clearly labeled with all pertinent information. Labels on uncured materials shall include date of manufacturer, shelf life and open time.
- F. Materials improperly stored or which become wet, warped or damaged shall be identified, conspicuously marked as rejected and removed from the job site.

1.4 SUBMITTALS

- A. Prior to purchasing materials or beginning work, submit for approval in triplicate:
 - 1. Printed specifications and installation instructions prepared by the roofing membrane manufacturer. Deviations from the Contract specifications shall be specifically noted in a separate letter if the manufacturer takes exception to them.
 - 2. Shop drawings of flashing and tapered insulation. In addition to the shop drawing requirements in Division 1, shop drawings for single ply membranes shall be prepared by the applicator or manufacturer on sheets containing his name and the project job number. Details of terminations, penetrations, etc. shall be specifically prepared for this Project. Submission of cuts of manufacturer's standard details will not be acceptable substitutes for shop drawings. The Contract drawing details may be reproduced on the shop drawings; circle or note any changes. Shop drawings prepared by other than the manufacturer shall bear the manufacturer's approval stamp and project number prior to submission to the architect.
 - 3. Letter from companies issuing Warranties that they will do so for the work as indicated and specified in the Contract Documents or noting exceptions thereto.
 - 4. Certification from the manufacturer that the Applicator has been approved
 - 5. Affidavit that Contractor has applied for the manufacturer's warranty.
 - 6. Facsimile of the manufacturer's warranty.
- B. Following completion submit in triplicate:
 - 1. Contract drawings marked to indicate deviations between work indicated and installed.
 - 2. Exact location of sheet roofing seams and dates each roof area was started and completed.

1.5 PRODUCT DELIVERY, STORAGE & HANDLING

- A. Deliver materials in sufficient quantity to permit work to continue without interruption.
- B. Store moisture susceptible materials in dry areas protected from sun and weather. Store in trailers or on raised platforms covered with weatherproof tarpaulins. Plastic sheeting is not permitted. Remove shrink wrapping as soon as material is delivered to site. Observe manufacturer's recommendations for temperature limits of stored materials.
- C. Store materials containing solvents in dry, well ventilated spaces. Keep lids on tight. Provide proper fire protection for flammable materials. Use materials before expiration of their shelf life.
- D. Do not stockpile materials on roof for more than 1-1/2 day's work unless otherwise approved.

- E. Store plastic and rubber roll goods flat. Avoid damage or embedment of foreign materials. Do not permit debris or products of demolition to lodge under membrane.

1.6 SPECIAL PRECAUTIONS

- A. Keep liquids in airtight containers. Store above 60° F. for 24 hours prior to use. Keep lids on except when removing material. Do not dilute unless recommended by manufacturer. Use thinners, not cleaners, for thinning. Do not mix contents of one container with another except for 2-part materials. Use clean brushes and rollers free of remains of unlike material.
- B. Prevent damage to membrane from hard soled shoes, sharp edged equipment, tools and fasteners.

1.7 ENVIRONMENTAL CONDITIONS

- A. Do not install insulation, roofing or flashing during inclement weather, on wet or frost-covered surfaces, during rainfall, blowing dust or high winds.
- B. The minimum surface temperature for adhesive application is 40°F. Do not apply adhesives at higher temperatures when humidity causes condensation. Follow manufacturer's recommendations when ambient temperatures fall below 40°F.

1.8 FIRE RESISTANCE CLASSIFICATION

- A. The complete roofing assembly shall have an Underwriters Laboratory (UL) Class A rating.

1.9 WIND UPLIFT CLASSIFICATION

- A. The complete roofing assembly shall have a Factory Mutual Global wind uplift classification of 1-60

1.10 PRECONSTRUCTION CONFERENCE

- A. Prior to but not less than 30 days before beginning work, and not less than 5 days following approval of all shop drawings, representatives of the Architect, and Owner will meet with the Contractor, the Roofing Subcontractor, his Superintendent or Foreman who will be engaged full time on the Project, to review the earlier submitted and acceptable materials and submittals and procedures to be followed in performing the work. At this time, submit samples and progress schedule. The Contractor shall keep the minutes of the meeting and distribute same as noted.
- B. The minutes of the conference shall be submitted by the Contractor to all attendees and interested parties no less than 3 days after the conference.
- C. Prior to, but not more than seven days before beginning work, a second meeting of the same parties and the Roofing Contractor's superintendent or foreman who will be engaged full time on the Project will be held at the job site to review storage locations, operating procedures and inspect the roof deck. At this time, the Roofing Contractor shall note, in writing, all items and conditions that are unacceptable and which would preclude proper application of his materials.

Failure to do so will be construed as acceptance of the deck as suitable for roofing installation.

1.11 GUARANTEES, WARRANTIES

- A. Furnish to the Owner, duplicate executed copies of the membrane manufacturer's 20 year Warranty providing that the membrane and associated flashing will remain watertight under ordinary wear and tear by the elements.
- B. Furnish to the Owner, duplicate executed copies of the membrane manufacturer's Material Warranty warranting that the membrane is free of defects in materials and workmanship and will not prematurely deteriorate to the point of failure because of weathering for a period 20 years from the date of installation.
- C. Furnish to the Owner, duplicate executed copies of a Guarantee in the form at the end of this Section.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Elastomeric Sheet Roofing: A total system of compatible materials designed for fully adhered installation consisting of a sheet membrane, vulcanized and non-vulcanized flashing sheet, adhesives and all other materials required for a complete installation, except as otherwise specified all produced by the same manufacturer with a minimum of 5 years of successful applications.
 - 1. Sheet Membrane: ASTM D 4637, Type I, EPDM rubber, white, 60 mils thick, rated Fire Resistant; Carlisle Syntec's Sure-Seal or Firestone's RubberGard, 2.
 - 2. Un-vulcanized Flashing: ASTM D 4811, Type I
 - 3. Adhesives: Contact type butyl recommended by the sheet manufacturer for bonding EPDM to substrates and to itself.
 - 4. Solvents and Primers: As recommended by the sheet manufacturer for cleaning and priming surfaces, diluting adhesive. Gasoline is not permitted for cleaning.
 - 5. Seam Splicing Tape and Cover Tape: As recommended by the sheet manufacturer.
 - 6. Sealers; pourable: 2-part urethane, pourable grade, as recommended by the sheet manufacturer.
- B. Insulation: Isocyanurate insulation boards with glass fiber facers, ASTM C 1289, Type II, Class 1, Maximum size: 4' x 4'. Each board shall be factory marked with the manufacturer's name and product name. Flat boards shall be 3" thick and tapered boards tapered ¼", 3/16" or ½" per foot as indicated from a minimum 1.5" at drains. Taper crickets 1/2" per ft. Acceptable products: E'NRG'Y 2, R-Max Multi-Max FA or Atlas ACFoam.

- C. GMGB (Glass mat gypsum board) ASTM C 1177, 1/2" thick equal to Georgia Pacific DensDeck primed.
- D. Tapered Edge Strip: ASTM C 208, Class C, asphalt impregnated, 12" wide tapering 1-1/2" to 1/8". Provide where indicated and at perimeter of crickets.
- E. Fasteners Except as otherwise specified hereinafter, all fasteners for use with treated wood shall be stainless steel or galvanized with G185
 - 1. For securing wood nailers insulation and blocking to concrete and masonry: Drive pins, FS FF-S-325, Group IV equal to Rawl-Drive, USE Sup-R-Split, Olympic CD-10.
 - 2. For securing sheet membrane to wood nailers and for termination bars: Membrane manufacturer's batten strip or stress plate and screw system.
 - 3. For securing flashing at top: stainless steel or galvanized pin anchors or galvanized roofing nails with min. 1" heads in wood nailers.
 - 4. For securing EPDM flashing where indicated: stainless steel termination bar
- F. Vapor retarder: Self-adhering, self-sealing, rubberized asphalt sheet membrane; ASTM D 1970, CertainTeed Winter Guard, GAF Weather Watch, Tamko Moisture Guard or W.R. Grace Ice and Water Shield.
- G. Wood blocking and nailers: Hem-Fir, PS 20, 19% max. moisture content, AWPI, Std. C2 pressure treated with ACQ or CBA preservatives.
- H. Termination Bars: Stainless steel; AISI Type 302, 1" x 1/8", punched 8" o.c.

PART 3 - EXECUTION

3.1 PREPARATION FOR ROOFING INSTALLATION

- A. Steel deck shall be clean, dry and relatively smooth without fins or projections, free of frost and foreign materials.
- B. Wood blocking shall be in place and secured. Install wood blocking in configuration indicated with 1/2" end joints. Secure to resist a horizontal force of 175 lbs/lin. ft.

3.2 UNDERLAYMENT BOARD INSTALLATION.

- A. Install GMGB boards over the steel deck with long edges aligned and over flanges and short edges staggered. Keep joints tight.
- B. Secure to the steel deck with Carlisle HP X Fasteners: a heavy duty #15 threaded fastener with a #3 phillips drive spaced one per two sq. ft.

3.3 VAPOR RETARDER INSTALLATION

- A. Install the vapor retarder parallel to the eaves. Shingle up from the drains lapping the previous sheet and ends 6". Remove the release paper as the sheet is unrolled and press in place. Roll the laps to obtain uniform adhesion.
- B. Turn the sheet 4" up penetrations and vertical surfaces and seal to them.
- C. Do not install more vapor retarder than can be covered by insulation and membrane within 2 weeks.

3.4 INSULATION INSTALLATION

- A. Do not install more board or insulation than can be covered by membrane and flashed in the same day.
- B. Install insulation per approved shop drawings with positive slope to drain. Install dry with fasteners with moderately tight joints parallel to walls and eaves. Align joints in both directions. Where more than one layer is used, stagger joints with the joints below by ½. Repair damaged edges and broken corners with small pieces or replace with new boards.
- C. Cut and fit boards neatly at projections and vertical surfaces to finish within 1/8" of them.
- D. Install overlay boards over insulation and secure both to the metal deck with screws and stress plates at density, spacings and pattern recommended by the membrane and/or insulation manufacturer and approved by F.M. Global for a wind uplift classification of 1-60.
- E. Trim insulation neatly around drains, stacks, curbs and similar projections. Provide tapered edge strips at penetrations and vertical surfaces to provide drainage and to top of blocking where indicated.

3.5 ROOF MEMBRANE INSTALLATION

- A. Install membrane over insulation/cover board on same day it is installed.
- B. Follow manufacturer's latest edition of printed installation instructions or specifications. Where they conflict with Contract drawings or these specifications, the more stringent take precedence; however, notify the Architect, in writing, where conflicts occur.
- C. Use tools, brushes, rollers, etc. recommended by the sheet roofing manufacturer.
- D. Use sheets in as long lengths as practical to reduce joints to a minimum. Inspect both sides of sheets prior to positioning. Mark and set aside for the Architect's and manufacturer's review those sheets that exhibit defects such as pin holes, tears, inability to lay flat, defective factory seams, cuts, pock marks that exceed 1/8" x 1/16", are deeper than 1/2 the sheet thickness or are in concentrations of 20 or more per sq. ft., etc. At his sole discretion, the Architect may reject sheets exhibiting these defects or may accept a patch applied over, and bonded to areas judged defective.
- E. Insofar as possible, orient all sheets on any one roof surface in the same direction. Unroll

sheets in position without stretching. Position, trim and cut each sheet before seaming. Remove creases and wrinkles and allow to relax for at least 1/2 hour. Provide 4" of excess material for each 100'. Install sheets from high point down to drains to avoid the possibility of water penetrating under membrane. Orient field seams so they do not buck water. Field and factory seams shall not occur within 24" of drains. Lap sides and ends 6" min.

- F. Fold each sheet approximately in half. Apply bonding adhesive at the manufacturer's recommended rate evenly to the exposed substrate and back of the clean exposed sheet. Keep adhesive from areas to be spliced. Adhesive film shall be uniform and free of voids, bubbles and lumps. Do not bond until adhesive on both contact faces has dried to the degree recommended by manufacturer. Follow his directions for testing dryness. Roll the sheet into applied adhesive free of voids and wrinkles. Repeat for the other portion of the sheet. Apply pressure with a roller or stiff broom to adhered areas to ensure total contact between the sheet and the substrate.
- G. Bond faces of lap joints and spliced joints with manufacturer's recommended butyl tape. Surfaces to be adhered shall be clean and dry, free of buckles, wrinkles and defects that might preclude a uniform bond. Wipe mating faces with splice primer. Take special care in cleaning surfaces.
 - 1. Install tape per manufacturer's directions. Allow primer to thoroughly dry before applying tape. Roll the tape out straight. If it runs off, cut and begin anew. Extend release paper edge 1/2" beyond seam edge. Broom tape in and remove paper.
 - 2. After contact faces have been brought together, apply pressure across the seam with rollers to firmly and uniformly bond sheets together free of bubbles and fishmouths.
- H. Following seaming, check field seams for improper bonding, fishmouths and bubbles. Open and re-bond or cut out and patch to 3" beyond cut.
- I. Apply 6" wide cover tape over all field seams in roofing and flashing.
- J. At vertical surfaces, carry membrane up 2" and secure with screws and stress plates or metal nailing strips secured to masonry 12" o.c. Install stress plate and screw system per manufacturer's instructions.

3.6 FLASHING

- A. Apply elastomeric sheet flashing where membrane terminates at walls, parapets, curbs, penetrations and elsewhere where indicated.
- B. Cover metal strips and edges of metal flanges with bond breaker tape. Clean and prime metal.
- C. Extend flashing over membrane as indicated on drawings. Carry up walls to underside of cap flashing. At curbs extend flashing up and over wood blocking and adhere with bonding adhesive. Space fasteners a maximum 10" o.c. Lap ends 4" and seal. Carry each side 3" around corners to provide a 6" lap and seal. Where top of flashing is not covered by cap flashing, provide a termination bar secured 8" o.c.
- D. Install elastomeric sheet flashing by bonding to membrane and properly cleaned and prepared surfaces, using manufacturer's recommended adhesives and methods specified above. Press

tightly into corners, but take care not to reduce sheet thickness. Where flashing terminates at round projections, apply a stainless steel drawband over a 1" wide cushioning strip of membrane.

- E. Build in metal items and, where indicated, secure flanges to blocking.

3.9 FIELD QUALITY CONTROL

- A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
 - 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.
- B. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.

3.10 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

END OF SECTION 07 53 10

FORM OF GUARANTEE

The undersigned Roofing Contractor hereby agrees for a period of 2 years after the executed date hereof, to inspect and make immediate temporary repairs required to stop leaks or correct other defects in the roofing and associated work of the project named herein, within 24 hours of notice received from the Owner by telephone, telegram or letter; and further agrees to make permanent repairs to restore or replace the work to the quality standards originally specified, within reasonable time and as weather conditions permit; and further agrees to make such temporary and permanent repairs without reference to or consideration of the cause or nature of the leaks or defect in the roofing and associated work.

Repair work required because of failure of materials or workmanship within the guarantee period will be completed by the Roofing Contractor without cost to the Owner. Repair work required because of acts of God, abuse of the work, alterations, or failure of the supporting structure of substrate (other than that resulting from defects in the roofing and associated work) and all repair work required for defects occurring beyond the expiration of the guarantee period, will be paid for by the Owner promptly after completion of the required work in each instance.

Repair work completed at the Owner's cost will be paid for by the Owner at prevailing rates, upon receipt by Owner of Roofing Contractor's itemized invoice of quantities and unit costs for labor and material, including not more than 15% mark-up for office and shop overhead and profit.

The undersigned Roofing Contractor also hereby agrees, for a period of 2 years after the date hereof, to make an annual maintenance inspection of the roofing and associated work; and to submit a written report of such inspection to the Owner, stating the nature and circumstances (if known) of damage, deterioration, unusual wear or weatherizing effects observed, and recommending maintenance work required to restore the work and prevent further deterioration. Inspection shall be made in the Spring after the likelihood of freezing weather has passed. The cost of the 2 annual inspections and reports is included in the original contract price for the roofing and associated work, and will not be paid for separately by the Owner.

Signed by: _____ Date: _____

For: _____ as its _____
(Roofing Contractor)

Signed by: _____ Date: _____

For: _____ as its _____
(Owner)

Approximate area of roofing _____ sq. ft.

Project Name

Address

City/Town State Zip Code

SECTION 07 90 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Sealants and joint backing.
2. Related sections include but are not limited to:
 - a. Section 08 11 13 – Hollow Metal Doors and Frames
 - c. Section 08 90 00 – Louvers and Vents
 - e. Section 09 29 00 – Gypsum Board
 - f. Section 09 91 00 – Painting
 - g. Section 12 32 00 – Manufactured Wood Casework Systems & Equipment

1.2 SUBMITTALS

A. Products Data:

1. Submit data for sealant materials, performance, and substrate applications and preparation for substrates.
2. Indicate available colors for each sealant type for selection.
3. Submit schedule indicating assemblies to be sealed – exterior and interior application locations.

B. Samples:

1. Submit two sets of samples, 3 inches long illustrating sealant colors for selection.

C. Manufacturer's Installation Instructions:

1. Submit special procedures, substrate or assembly applications, surface preparation, and perimeter conditions requiring special attention.

1.3 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Applicator: Company specializing in performing Work of this section with minimum three years documented experience.

1.4 MOCK-UP

A. Provide mock-up of sealant joints in conjunction with window mockups specified in other sections.

B. Construct mock-up with specified sealant types and with other components noted.

1. Determine preparation and priming requirements based on manufacturers recommendations; take action necessary for correction of failure of sealant tests on mock-up.

- 2. Verify sealants, primers, and other components do not stain adjacent materials.
- C. Locate where directed.
- D. Accepted mockup may remain as part of the Work.

ENVIRONMENTAL REQUIREMENTS

1.5

- A. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

1.6 COORDINATION

- A. Coordinate Work with sections referencing this section.

1.7 WARRANTY

- A. Provide five year manufacturer's warranty for installed sealants and accessories which fail to achieve airtight seal or watertight seal, exhibit loss of adhesion or cohesion, and sealants which do not cure.

PART 2 - PRODUCTS

2.1 JOINT SEALERS

- A. Silicone Sealant Manufacturers: Provide one of the following:
 - 1. Pecora Corporation .
 - 2. General Electric Silicones.
 - 3. Dow Corning.
 - 4. Tremco Inc.
 - 5. Or approved equal.
- B. Other Sealant Manufacturers: Provide one of the following:
 - 1. Pecora Corporation.
 - 2. Sonneborn Building Products.
 - 3. Tremco Inc.
 - 4. Or approved equal.
- C. Type A - Silicone Exterior Joints : ASTM C920, Type S, Grade NS , Class 25; NT, M, G, A and O: single component, neutral curing, nonstaining, nonbleeding, capable of continuous water immersion, color as selected.
 - 1. General Electric; Silpruf.
 - 2. Dow Corning; 790 for EIFS joints or 795 for other joints.
 - 3. Pecora; 890 Silicone for EIFS joints; 864 Silicone for other joints.
 - 4. Tremco; Spectrum 1 for EIFS joints; Spectrum 2 for other joints.
 - 5. Or approved equal.
 - 6. Applications: Use for exterior non-traffic bearing joints , including EIFS joints.
 - a. Control and soft joints in masonry.
 - b. Joints between concrete or stone and other materials.
 - c. Joints between metal frames and other materials.
 - d. Other exterior non -traffic bearing joints for which no other sealant is indicated.

- D. Type B - Polyurethane Traffic Joints: ASTM C920, Type M, Grade P, Class 25; self leveling, two component, chemical curing, nonstaining, nonbleeding, capable of continuous water immersion, horizontal traffic grade, color as selected.
1. Dayton Superior Perma 230 SL
 2. DCP Quickmast Joint Sealant
 3. Sonneborn Sonolastic NP-1
 4. Or approved equal.
- E. Type C - Polyurethane Interior Joints: ASTM C 920, Type S, Grade NS, Class 25, Use NT, M, A, O; single component, chemical curing, nonstaining, non-bleeding, capable of continuous water immersion, horizontal traffic grade, color as selected.
1. CRL Tremco THC 900
 2. Sika Corp, Sikaflex-2C NS
 3. Sonneborn Building Products, Sonolastic 150
 4. Or approved equal.
- F. Type D - Acrylic Interior Joints: ASTM C834; single component, solvent curing, nonstaining, nonbleeding, nonsagging; color as selected.
1. Tremco; Acrylic Latex.
 2. Pecora; AC-20.
 3. Sonneborn; Sonolac.
 4. Or approved equal.
 5. Applications: Use for interior joints, except where sanitary sealant is required.
 - a. Interior wall and ceiling control joints.
 - b. Interior joints between door and window frames and wall surfaces.
 - c. Other interior joints for which no other type of sealant is indicated.
- G. Type E - Silicone Interior Sanitary Joints: ASTM C920; single component, solvent or neutral curing, non-sagging, nonstaining, fungus resistant, nonbleeding ; color as selected.
1. GE Silicones; SCS 1700 Series.
 2. Dow Corning; 786.
 3. Pecora; 898 Silicone Sanitary Sealant.
 4. Tremco; Tremsil 200.
 5. Or approve equal.
 6. Applications: Use for kitchens, bathrooms, toilet rooms, lockers, and other wet areas:
 - a. Joints between plumbing fixtures and floor and wall surfaces.
 - b. Joints between kitchen and bath countertops and wall surfaces.
 - c. Joints between lockers and toilet accessories and adjacent surfaces.
 - d. Joints between sanitary wall panels and adjacent or penetrating materials.
- H. Type F - Exterior Metal Lap Joint Sealant: ASTM C1311, butyl or polyisobutylene, nondrying, non-skinning, non-curing.

2.2 ACCESSORIES

A. Primer:

1. Non-staining type, recommended by sealant manufacturer to suit application.

- B. Joint Cleaner:
 - 1. Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing:
 - 1. Closed cell round foam rod compatible with sealant; oversized 30 to 50 percent larger than joint width; to install in compression, recommended by sealant manufacturer to suit application
- D. Bond Breaker:
 - 1. Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify substrate surfaces and joint openings are ready to receive work.
- B. Verify joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

- A. Remove loose materials and foreign matter which might impair adhesion of sealant.
- B. Clean and prime joints.
- C. Perform preparation in accordance with ASTM C1193.
- D. Protect elements surrounding the Work of this section from damage or disfiguration.

3.3 INSTALLATION

- A. Perform installation in accordance with ASTM C1193.
- B. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- C. Install bond breaker where joint backing is not used.
- D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Install double sealant bead joints at exterior joints locations indicated on Drawings. Provide weeps to direct moisture penetrating first sealant bead to exterior.
- G. Tool joints concave.
- H. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections;

install with face 1/8 to 1/4 inch below adjoining surface.

- I. Compression Gaskets: Avoid joints except at ends , corners, and intersections; seal all joints with adhesive; install with face 1/8 to 1/4 inchbelow adjoining surface.

3.4 CLEANING

- A. Clean adjacent soiled surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Protect sealants until cured.

END OF SECTION 07 90 00

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes hollow-metal work. Related Requirements:
 - 1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, and finishes.
- . Shop Drawings: Include the following:
 - 1. Elevations of each door type.
 - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.
 - 5. Details of each different wall opening condition.
 - 6. Details of anchorages, joints, field splices, and connections.
 - 7. Details of accessories.
 - 8. Details of moldings, removable stops, and glazing.
 - 9. Details of conduit and preparations for power, signal, and control systems.

- D. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
 - 1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Amweld International, LLC.
 - 2. Ceco Door Products; an Assa Abloy Group company.
 - 3. LaForce, Inc.
 - 4. Steelcraft; an Ingersoll-Rand company.
 - 5. Or approved equal.
- B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 REGULATORY REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - 1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to au-

thorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

2.3 INTERIOR DOORS AND FRAMES

- A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
 - 1. Physical Performance: Level A according to SDI A250.4.
 - 2. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches.
 - c. Face: Metallic-coated, cold-rolled steel sheet, minimum thickness of 0.053 inch.
 - d. Edge Construction: Model 1, Full Flush at interior doors and Model 2, Seamless at fire and stair doors.
 - e. Core: Polystyrene .
 - 3. Frames:
 - a. Materials: Metallic-coated, steel sheet, minimum thickness of 0.053 inch.
 - b. Construction: Full profile welded.
 - 4. Exposed Finish: Prime

2.4 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, 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.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.5 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

- D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
 - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- G. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- H. Glazing: As indicated.

2.6 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
 - 1. Fire Door Cores: As required to provide fire-protection and temperature-rise ratings indicated.
 - 2. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches.
 - 3. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets.
 - 4. Bottom Edge Closures: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets.
 - 5. Astragals: Provide overlapping astragal 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 or as required to comply with published listing of qualified testing agency.
- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 1. 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.
 - 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.

4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
 5. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:
 - 1) Two anchors per jamb up to 60 inches high.
 - 2) Three anchors per jamb from 60 to 90 inches high.
 - 3) Four anchors per jamb from 90 to 120 inches high.
 - 4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches high.
 - 2) Four anchors per jamb from 60 to 90 inches high.
 - 3) Five anchors per jamb from 90 to 96 inches high.
 - 4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 6. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 7. Terminated Stops: Terminate stops 6 inches above finish floor with a 45 -degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.
- D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.
- F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.

3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow-metal work.
5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.7 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.8 ACCESSORIES

- A. Louvers: Provide louvers for interior doors, where indicated, which comply with SDI 111C, with blades or baffles formed of 0.020-inch-thick, cold-rolled steel sheet set into 0.032-inch-thick steel frame.
 1. Sightproof Louver: Stationary louvers constructed with inverted-V or inverted-Y blades. B.
 2. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
- B. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-rated openings, install frames according to NFPA 80.
 - b. Install door silencers in frames before grouting.
 - c. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - d. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post installed expansion anchors.
 - 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
 - 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 - 5. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary. Non-Fire-Rated Steel Doors:
 - 1. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
 - 2. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.
 - a. At Bottom of Door: [3/4 inch] [5/8 inch] plus or minus 1/32 inch.
 - b. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.
 - 3. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 - 4. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
- D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow metal manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow-metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- E. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

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. Solid-core doors with wood-veneer faces.
 - 2. Factory finishing flush wood doors.
- B. Related Requirements:
 - 1. Section 088000 "Glazing" for glass view panels in flush wood doors.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction and trim for openings. Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:
 - 1. Dimensions and locations of blocking.
 - 2. Dimensions and locations of mortises and holes for hardware.
 - 3. Dimensions and locations of cutouts.
 - 4. Undercuts.
 - 5. Requirements for veneer matching.
 - 6. Doors to be factory finished and finish requirements.
 - 7. Fire-protection ratings for fire-rated doors.
- D. Samples for Verification:
 - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three Samples showing typical range of color and grain to be expected in finished Work.
 - 2. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used.
 - a. Provide Samples for each species of veneer and solid lumber required.
 - b. Provide Samples for each color, texture, and pattern of plastic laminate required.

- c. Finish veneer-faced door Samples with same materials proposed for factory finished doors.
3. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.4 QUALITY ASSURANCE

- A. **Manufacturer Qualifications:** A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body and is a certified participant in AWI's Quality Certification Program.
- B. **Vendor Qualifications:** A vendor that is certified for chain of custody by an FSC-accredited certification body.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.6 FIELD CONDITIONS

- A. **Environmental Limitations:** Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.
- B. **Environmental Limitations:** Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during remainder of construction period.

1.7 WARRANTY

- A. **Special Warranty:** Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
 - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
 - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Graham Wood Doors; an Assa Abloy Group company.
 - 2. Marlite.
 - 3. Marshfield Door Systems, Inc.
 - 4. Mohawk Doors; a Masonite company.
 - 5. or approved equal.

2.2 FLUSH WOOD DOORS, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with AWI's, AWMAC's, and WI's "Architectural Woodwork Standards."
 - 1. Provide AWI Quality Certification Labels indicating that doors comply with requirements of grades specified.
 - 2. Contract Documents contain selections chosen from options in quality standard and additional requirements beyond those of quality standard. Comply with those selections and requirements in addition to quality standard.
- B. Regional Materials: Flush wood doors shall be manufactured within 500 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of Project site.
- C. STC Rating: min. 30
- D. Regional Materials: Flush wood doors shall be manufactured within 500 miles of Project site.
- E. Certified Wood: Flush wood doors shall be certified as "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."
- F. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that do not contain urea formaldehyde.
- G. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that 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." G. WDMA I.S.1-A Performance Grade:
 - 1. Heavy Duty unless otherwise indicated.
 - 2. Extra Heavy Duty: Classrooms public toilets janitor's closets assembly spaces exits.

- H. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
1. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.
 2. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
 3. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
 4. 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.
 5. Pairs: Provide formed-steel edges and astragals with intumescent seals.
 - a. Finish steel edges and astragals to match door hardware (locksets or exit devices).

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

- A. Interior Solid-Core Doors:
1. Grade: Premium, with Grade A faces.
 2. Species: intent is to match finish of existing corridor door – submit samples for architect’s final selection.
 3. Cut: intent is to match cut of existing corridor door – submit samples for architect’s final selection.
 4. Match between Veneer Leaves: Slip match (intent is to match grain appearance of existing corridor door- submit samples for architect’s final selection.)
 5. Assembly of Veneer Leaves on Door Faces: Center-balance match.
 6. Exposed Vertical Edges: Same species as faces - edge Type A.
 7. Core: Either glued wood stave or structural composite lumber.
 8. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering.
 9. WDMA I.S.1-A Performance Grade: Heavy Duty.

2.4 LIGHT FRAMES AND LOUVERS

- A. Metal Frames for Light Openings in Fire-Rated Doors: 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.

2.5 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
 2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
 1. Fabricate door and transom panels with full-width, solid-lumber, rabbeted, meeting rails. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.
- D. Openings: Factory cut and trim openings through doors.
 1. Light Openings: Trim openings with moldings of material and profile indicated.
 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
 3. Louvers: Factory install louvers in prepared openings.

2.6 FACTORY FINISHING

- A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Use only paints and coatings that 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."
- D. Transparent Finish:
 1. Grade: Custom.
 2. Finish: WDMA TR-6 catalyzed polyurethane.
 3. Sheen: Semigloss.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
 - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
 - 1. Install fire-rated doors according to NFPA 80.
- C. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 - 1. Clearances: Provide 1/8 inch at heads, jambs, and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
 - a. Comply with NFPA 80 for fire-rated doors.
 - 2. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
 - 3. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Mechanical door hardware for the following:
 - a. Swinging doors.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Details of electrified door hardware.
- C. Samples: For each exposed product and for each color and texture specified.
- D. Other Action Submittals:
 - 1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - a. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
 - b. Content: Include the following information:
 - 1) Identification number, location, hand, fire rating, size, and material of each door and frame.
 - 2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
 - 3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
 - 4) Description of electrified door hardware sequences of operation and interfaces with other building control systems.
 - 2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the

course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.

- B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as follows:
 - 1. For door hardware, an Architectural Hardware Consultant (AHC).
- C. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.
- D. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- E. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.
 - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
 - 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
 - b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
- B. Deliver keys to Owner by registered mail or overnight package service.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.
 - a. Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled on Drawings to comply with requirements in this Section.
1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and equivalent in function and comparable in quality to named products.
 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:
1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.
 2. References to BHMA Designations: Provide products complying with these designations and requirements for description, quality, and function.

2.2 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal frames.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager Companies.
 - b. IVES Hardware; an Ingersoll-Rand company.
 - c. McKinney Products Company; an ASSA ABLOY Group company.

2.3 CONTINUOUS HINGES

- A. Continuous Hinges: BHMA A156.26; minimum 0.120-inch- thick, hinge leaves with minimum overall width of 4 inches fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.
- B. Pin-and-Barrel-Type Hinges:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager Companies.
 - b. IVES Hardware; an Ingersoll-Rand company.
 - c. McKinney Products Company; an ASSA ABLOY Group company.

- C. Continuous, Gear-Type Hinges: Extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager Companies.
 - b. IVES Hardware; an Ingersoll-Rand company.
 - c. McKinney Products Company; an ASSA ABLOY Group company.

2.4 MECHANICAL LOCKS AND LATCHES

- A. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
- B. Mortise Locks: BHMA A156.13; Operational Grade 1; stamped steel case with steel or brass parts; Series 1000.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Best Access Systems; Div. of Stanley Security Solutions, Inc.
 - b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
 - c. Schlage Commercial Lock Division; an Ingersoll-Rand company.

2.5 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.
 - 1. Manufacturer: Same manufacturer as for locking devices.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow USA; an ASSA ABLOY Group company.
 - b. Schlage Commercial Lock Division; an Ingersoll-Rand company.
 - c. Yale Security Inc.; an ASSA ABLOY Group company.
- B. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
- C. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.6 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.
1. No Master Key System: Only change keys operate cylinder.
 2. Master Key System: Change keys and a master key operate cylinders.
 3. Grand Master Key System: Change keys, a master key, and a grand master key operate cylinders.
 4. Great-Grand Master Key System: Change keys, a master key, a grand master key, and a great-grand master key operate cylinders.
 5. Existing System:
 - a. Master key or grand master key locks to Owner's existing system.
 - b. Re-key Owner's existing master key system into new keying system.
 6. Keyed Alike: Key all cylinders to same change key.
- B. Keys: Nickel silver.
1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: "DO NOT DUPLICATE."
 2. Quantity: In addition to one extra key blank for each lock, provide the following:
 - a. Cylinder Change Keys: Three.
 - b. Master Keys: Five.
 - c. Grand Master Keys: Five.
 - d. Great-Grand Master Keys: Five.

2.7 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
 - b. LCN Closers; an Ingersoll-Rand company.
 - c. Yale Security Inc.; an ASSA ABLOY Group company.

2.8 MECHANICAL STOPS AND HOLDERS

- A. Wall-Mounted Stops: BHMA A156.16; aluminum base metal.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager Companies.
 - b. IVES Hardware; an Ingersoll-Rand company.
 - c. Rockwood Manufacturing Company.

2.9 OVERHEAD STOPS AND HOLDERS

- A. Overhead Stops and Holders: BHMA A156.8.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Glynn-Johnson; an Ingersoll-Rand company.
 - b. Rockwood Manufacturing Company.
 - c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.10 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager Companies.
 - b. Reese Enterprises, Inc.
 - c. Zero International.

2.11 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch- thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Baldwin Hardware Corporation.
 - b. IVES Hardware; an Ingersoll-Rand company.
 - c. Rockwood Manufacturing Company.

2.12 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not

permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Fire-Rated Applications:
 - a. Wood or Machine Screws: For the following:
 - 1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
 - 2) Strike plates to frames.
 - 3) Closers to doors and frames.
 - b. Steel Through Bolts: For the following unless door blocking is provided:
 - 1) Surface hinges to doors.
 - 2) Closers to doors and frames.
 - 3) Surface-mounted exit devices.
3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.13 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
- B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
- C. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.

1. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- D. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- E. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- F. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 1. Replace construction cores with permanent cores as directed by Owner.
 2. Furnish permanent cores to Owner for installation.
- G. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- H. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- I. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
- J. See drawings for hardware information for each door.

3.2 FIELD QUALITY CONTROL

- A. Architectural Hardware Consultant: Engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
 1. Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.3 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to

operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

1.2 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

1.3 DEMONSTRATION

- A. Provide training for Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01 Section "Demonstration and Training."

3.4 DOOR HARDWARE SCHEDULE

- A. Locksets, exit devices, and other hardware items are referenced in the following hardware sets for series, type and function. Refer to the above-specifications for special features, options, cylinders/keying, and other requirements.

Hardware Group No. 01

3 each	Hinges	5BB1 4.5 x 4.5	652
1 each	Mortise classroom	L9070L 06A	626
1 each	Closer	4111 x ST-1544	689
1 each	drop plate	4020-18	689
1 each	kick plate	8400 8"x2" LDW	630
3 each	Silencers	SR64	Gry
1 each	Mortise Classroom Lock	Match Key System	

Hardware Group No. 02

1 each	Cont. Hinge	112HD-CL-85	652
1 each	Mortise classroom	L9070L 06A	626
1 each	Closer	4111 x ST-1544	689
1 each	drop plate	4020-18	689
1 each	kick plate	8400 8"x2" LDW	630
3 each	Silencers	SR64	Gry
1 each	Mortise Classroom Lock	Match Key System	

Hardware Group No. 03 NOT USED

1 each	Cont. Hinge	112HD-CL-85	652
1 each	Exit Device	98-L-06-1439	619
Verify proper strike with aluminum frame manufacturer			
1 each	SFIC Rim Cylinder	80-159	SCH
1 each	Permanent Core	Match Key System	
1 each	Surface Closer	4111-SCUSH	689
1 each	Weatherstripping	Zero #570AA Head/Jamb Seals	
1 each	Threshold	656A-MSLA-10	A-ZER
1 each	Door Contact	679-05-HM	BLK SCE

END OF SECTION 087100

SECTION 089000 - LOUVERS AND VENTS

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. Fixed, extruded-aluminum louvers. (to be provided and installed by HVAC subcontractor).
- B. Related Sections:
 - 1. Section 081113 "Hollow Metal Doors and Frames" for louvers in hollow-metal doors.
 - 2. Section 081416 "Flush Wood Doors" for louvers in flush wood doors.

1.3 DEFINITIONS

- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.
- B. Horizontal Louver: Louver with horizontal blades; i.e., the axes of the blades are horizontal.
- C. Storm-Resistant Louver: Louver that provides specified wind-driven rain performance, as determined by testing according to AMCA 500-L.

1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified professional engineer, using structural and seismic performance requirements and design criteria indicated.
- B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.
 - 1. Wind Loads: Determine loads based on pressures as indicated on Drawings.

2. Wind Loads: Determine loads based on a uniform pressure of 30 lbf/sq. ft., acting inward or outward.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes, without buckling, opening of joints, overstressing of components, failure of connections, or other detrimental effects.
 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- D. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
 1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.
- B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.
 1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
 2. Show mullion profiles and locations.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Delegated-Design Submittal: For louvers indicated to comply with structural performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

1.7 QUALITY ASSURANCE

- A. Source Limitations: Obtain louvers and vents from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.
- B. Welding: Qualify procedures and personnel according to the following:
 1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

2. AWS D1.3, "Structural Welding Code - Sheet Steel."
 3. AWS D1.6, "Structural Welding Code - Stainless Steel."
- C. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5, T-52, or T6.
- B. Fasteners: Use types and sizes to suit unit installation conditions.
1. Use tamper-resistant screws for exposed fasteners unless otherwise indicated.
 2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
 3. For fastening galvanized steel, use hot-dip-galvanized steel or 300 series stainless-steel fasteners.
 4. For fastening stainless steel, use 300 series stainless-steel fasteners.
 5. For color-finished louvers, use fasteners with heads that match color of louvers.
- C. Post installed Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.2 FABRICATION, GENERAL

- A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.
1. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern [unless horizontal mullions are indicated] [where indicated].

2. Horizontal Mullions: Provide horizontal mullions at joints [unless continuous vertical assemblies are indicated] [where indicated].
- C. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.
- D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
 1. Frame Type: Channel unless otherwise indicated.
- E. Include supports, anchorages, and accessories required for complete assembly.
- F. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches o.c., whichever is less.
 1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.
 2. Exterior Corners: Prefabricated corner units with mitered and welded blades and with semirecessed mullions at corners.
- G. Provide subsills made of same material as louvers or extended sills for recessed louvers.
- H. Join frame members to each other and to fixed louver blades with fillet welds concealed from view unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

- A. Horizontal Storm-Resistant Louver:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Construction Specialties, Inc.
 - b. Greenheck Fan Corporation.
 - c. Ruskin Company; Tomkins PLC.
 2. Louver Depth: 4 inches.
 3. Frame and Blade Nominal Thickness: Not less than 0.080 inch 0.060 inch for blades and 0.080 inch for frames.
 4. Louver Performance Ratings:
 - a. Free Area: As requested on MEP drawings and specifications.
 - b. Air Performance: As requested by engineer.

- c. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 3 inches per hour and a wind speed of 29 mph at a core-area intake velocity of 400 fpm.
- 5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.5 BLANK-OFF PANELS

- A. Insulated, Blank-Off Panels: Laminated panels consisting of insulating core surfaced on back and front with metal sheets and attached to back of louver.
 - 1. Thickness: 2 inches.
 - 2. Metal Facing Sheets: Aluminum sheet, not less than 0.032-inch nominal thickness.
 - 3. Insulating Core: extruded-polystyrene foam.
 - 4. Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturer's standard extruded-aluminum-channel frames, not less than 0.080-inch nominal thickness, with corners mitered and with same finish as panels.
 - 5. Seal perimeter joints between panel faces and louver frames with gaskets or sealant.
 - 6. Panel Finish: Same finish applied to louvers.
 - 7. Attach blank-off panels with sheet metal screws.

2.6 FINISHES, GENERAL

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

2.7 ALUMINUM FINISHES

- A. Finish louvers after assembly.
- B. High-Performance Organic Finish: 2-coat fluoropolymer finish complying with AAMA 2604 and containing not less than 50 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

- A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.
- F. Protect unpainted galvanized and nonferrous-metal surfaces that will be in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.
- G. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 079200 "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

- A. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
 - 1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 089000

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing galvanized steel stud and runner framing systems for interior gypsum board walls / partitions.
2. Galvanized steel stud and runner suspension systems for interior gypsum ceilings and soffits.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: Provide materials and construction identical to those tested according to ASTM E 119.
- B. STC-Rated Assemblies: Provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413.
- C. Recycled Content of Steel Products: Provide products with average recycled content of steel products such that postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

2.2 GALVANIZED FRAMING SYSTEMS

- A. Steel Studs and Runners: ASTM C 645. Use either steel studs and runners or dimpled steel studs and runners of equivalent minimum base-metal thickness.
 1. Minimum Base-Metal Thickness: As indicated on Drawings.
 2. Depth: 3-5/8 inches, 6 inches, 4 inches, 2-1/2 inches and 1-5/8 inches, as indicated on the drawings.
 3. Stud spacing 16" o.c. (unless noted differently).
 4. Provide / install horizontal stud blocking at each stud bay 16" o.c. at 4'-0" o.c. at vertical intervals above finish floor. Horizontal stud blocking shall match width and gauge of studs utilized in wall / partition.
 5. The metal gauge for stud wall framing vertical span shall be determined by manufacturers recommended standards. All vertical stud spans exceeding 10'-0" o.c. shall be braced back to floor / roof framing above for the entire partition / wall length.
- B. Slip-Type Head Joints: Where indicated, provide one of the following in thickness not less than indicated for studs and in width to accommodate depth of studs:

1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch- (51-mm-) deep flanges, installed with studs friction fit into top runner and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
 2. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch- (51-mm-) deep flanges and fastened to studs, and outer runner sized to friction fit inside runner.
 3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes due to deflection of structure above.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Dietrich Metal Framing; SLP-TRK Slotted Deflection Track.
 - 2) MBA Building Supplies; Slotted Deflecto Track.
 - 3) Steel Network Inc. (The); VertiTrack VTD Series.
 - 4) Superior Metal Trim; Superior Flex Track System (SFT).
 - 5) Telling Industries; Vertical Slip Track.
 - 6) Or approved equal.
- C. Firestop Tracks: 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. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Fire Trak Corp.; Fire Trak System attached to studs with Fire Trak Posi Klip.
 - b. Grace Construction Products; FlameSafe FlowTrak System.
 - c. Metal-Lite, Inc.; The System.
 - d. Steel Network Inc. (The); VertiTrack VTD Series.
 - e. Or approved equal.
- D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
1. Minimum Base-Metal Thickness: As indicated on Drawings.
- E. Cold-Rolled Channel Bridging: Steel, 0.053-inch (1.34-mm) minimum base-metal thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
1. Depth: As indicated on Drawings.
 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.
- F. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. Minimum Base-Metal Thickness: 0.033 inch (0.84 mm).
 2. Depth: 7/8 inch (22.2 mm).
- G. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.

1. Configuration: Asymmetrical or hat shaped.
- H. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
1. Depth: 3/4 inch (19 mm).
 2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch (0.8 mm).
 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- I. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (31.8 mm), wall attachment flange of 7/8 inch (22 mm), minimum uncoated-metal thickness of 0.018 inch (0.45 mm), and depth required to fit insulation thickness indicated.

2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- B. Hanger Attachments to Concrete:
1. Anchors: Capable of sustaining a load equal to 5 times that imposed as determined by ASTM E 488.
 - a. Type: Cast-in-place anchor, designed for attachment to concrete forms or postinstalled, expansion anchor.
 2. Powder-Actuated Fasteners: Capable of sustaining, a load equal to 10 times that imposed as determined by ASTM E 1190.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.
- D. Flat Hangers: Steel sheet, in size indicated on Drawings.
- E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch (1.34 mm) and minimum 1/2-inch- (13-mm-) wide flanges.
1. Depth: As indicated on Drawings.
- F. Furring Channels (Furring Members):
1. Cold-Rolled Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
 2. Steel Studs and Runners: ASTM C 645.
 - a. Minimum Base-Metal Thickness: 0.033 inch (0.84 mm).
 - b. Depth: As indicated on Drawings.
 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.
 - a. Minimum Base-Metal Thickness: 0.033 inch (0.84 mm).

4. Resilient Furring Channels: 1/2-inch-deep members designed to reduce sound transmission.
 - a. Configuration: Hat shaped.

2.4 AUXILIARY MATERIALS

- A. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.2 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
 1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (13-mm) clearance from jamb stud to allow for installation of control joint in finished assembly.

- c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
 - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
 - 4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 - a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
 - 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
 - 6. Curved Partitions:
 - a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
 - b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches (150 mm) o.c.
- E. Direct Furring:
 - 1. Screw to wood framing.
 - 2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
- F. Z-Furring Members:
 - 1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches (610 mm) o.c.
 - 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
 - 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.
- G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.3 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 3. Do not attach hangers to steel roof deck.
 4. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 5. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 6. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Seismic Bracing: Sway-brace suspension systems with hangers used for support.
- E. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 22 16

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Interior gypsum board.
 - 2. Tile backing panels.

- B. Related sections include but are not limited to the following:
 - 1. Section 05 50 00 – Metal Fabrications
 - 2. Section 06 10 00 – Rough Carpentry
 - 3. Section 07 21 00 – Building Insulation
 - 4. Section 07 90 00 – Joint Sealants
 - 5. Section 09 22 16 – Non-structural Metal Framing

1.2 SUBMITTALS

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

- B. Samples: For the following products:
 - 1. Trim Accessories: Full-size Sample in 12-inch- (300-mm-) long length for each trim accessory indicated.
 - 2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

1.3 QUALITY ASSURANCE

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

- C. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Install mockups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.
 - b. Each texture finish indicated.

 - 2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.

 - 3. Simulate finished lighting conditions for review of mockups.

4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 RECYCLED CONTENT OF GYPSUM PANELS

- A. Provide gypsum panel products with recycled content such that postconsumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of Five (5%) percent by weight for credit 4.1 "Materials and Resources".

2.2 INTERIOR GYPSUM BOARD

- A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.

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

- a. American Gypsum Co.
- b. BPB America Inc.
- c. G-P Gypsum.
- d. Lafarge North America Inc.
- e. National Gypsum Company.
- f. PABCO Gypsum.
- g. Temple.
- h. USG Corporation.
- i. Or approved equal.

- B. Type X:

1. Thickness: 5/8 inch (15.9 mm).
2. Long Edges: Tapered.

- C. Abuse-Resistant Type: Manufactured to produce greater resistance to surface indentation and through-penetration (impact resistance) than standard, regular-type and Type X gypsum board.

1. Core: 5/8 inch (15.9 mm), Type X.
2. Long Edges: Tapered.

2.3 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet.
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. Expansion (control) joint.
- g. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Fry Reglet Corp.
 - b. Gordon, Inc.
 - c. Pittcon Industries.
 - d. Or approved equal.
- 3. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 (ASTM B 221M), Alloy 6063-T5.
- 4. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.4 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

- 1. Interior Gypsum Wallboard: Paper.
- 2. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
- 3. 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 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 setting-type, sandable topping compound.
- 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
- 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

2.5 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 - 1. 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).
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
 - 1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
 - 2. Recycled Content: Provide blankets with recycled content.
- E. Acoustical Sealant: As specified in Division 07 Section "Joint Sealants."
 - 1. Provide sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Vapor Retarder: As specified in Division 07 Section "Building Insulation."

PART 3 - EXECUTION

3.1 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- D. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members, or provide control joints to counteract wood shrinkage.

3.2 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Type X: As indicated on Drawings and where required for fire-resistance-rated assembly.
 - 2. Flexible Type: As indicated on Drawings and apply in double layer at curved assemblies.

3. Abuse-Resistant Type: As indicated on Drawings.

3.3 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints at locations indicated on Drawings, according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 1. Cornerbead: Use at outside corners.
 2. Bullnose Bead: Use at outside corners where indicated.
 3. LC-Bead: Use at exposed panel edges.
 4. L-Bead: Use where indicated.
 5. U-Bead: Use at exposed panel edges where indicated.
 6. Curved-Edge Cornerbead: Use at curved openings.
- D. Exterior Trim: Install in the following locations:
 1. Cornerbead: Use at outside corners.
 2. LC-Bead: Use at exposed panel edges.
- E. Aluminum Trim: Install in locations indicated on Drawings.

3.4 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below:
 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 2. Level 2: Panels that are substrate for tile.
 3. Level 3: Panels that are surfaces for vinyl / fabric wall coverings.
 4. Level 4: At panel surfaces that will be exposed to view to be primed and finish painted, unless otherwise indicated.
 - a. Prime and finish painting and its application to surfaces are specified in other Division 09 Sections.
 5. Level 5: Panels that are to receive skim coating.
 - a. Primer and its application to surfaces are specified in other Division 09 Sections.

3.5 APPLYING TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.

3.6 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

SECTION 09 51 00 - ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
1. Suspended metal grid ceiling system.
 2. Acoustic panels.
 3. Drywall ceiling and soffit framing system.

1.2 PERFORMANCE REQUIREMENTS

- A. Suspension System: Rigidly secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of 1:360. Conform design and installation to meet all seismic requirements.
- B. Surface Burning Characteristics: Maximum flame spread/smoke developed rating 25/450 when tested in accordance with ASTM E84.

1.3 SUBMITTALS

- A. Shop Drawings:
1. Provide plan layout for all areas to receive acoustic tile ceilings and drywall/gypsum board ceiling and soffits. Indicate grid layout and related dimensions, junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to system.
 2. Indicate method of suspension where interference exists.
 3. Indicate tile types as designated in schedule within this section.
 4. Indicate all seismic details to conform to seismic constraint requirements for all ceiling layouts throughout the building.
- B. Product Data:
1. Submit data on metal grid system components and acoustic units.
 2. Submit data on metal grid ceiling/soffit framing system components.
- C. Samples:
1. Submit two samples 12 x 12 inch in size illustrating material, edges, and finish of acoustic units.
 2. Samples: Submit two samples each, 12 inches long, of suspension system main runner, cross runner, and perimeter molding.
 3. Samples: Submit two samples each, 12 inches long of drywall/gypsum board framing system.
- D. Manufacturer's Installation Instructions:
1. Submit special procedures and perimeter conditions requiring special attention.

1.4 QUALITY ASSURANCE

- A. Conform to CISCA requirements.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years experience.

1.6 MOCKUP

- A. Construct mock-up for each acoustic tile type, 12 feet x 12 feet, including typical field and edge conditions.
- B. Locate where directed by Architect for field review and approval.
- C. Incorporate accepted mockup as part of Work.

1.7 PRE-INSTALLATION MEETING

- A. Convene minimum one week prior to commencing Work of this section.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustic unit installation.

1.9 EXTRA MATERIALS

- A. Furnish 100 sq ft of EACH type extra panels to Owner.

PART 2 – PRODUCTS

2.1 ACOUSTIC TILE

- A. Manufacturers: Provide one of the following:
 - 1. Armstrong World Industries.-basis of design
 - 2. USG Interiors.
 - 3. Certainteed.
 - 4. Or approved equal.
- B. Acoustical Ceiling Types:
 - 1. Acoustical Ceiling Tile ACT-1A; Sanitary and Special Use-Armstrong World Industries: CLEAN ROOM VL UNPERFORATED #868- Basis of Design for Culinary Arts Lab area

BASE-BID

- a. Size: as shown on reflected ceiling plans by 5/8 inch thick.
- b. Material: wet-formed mineral fiber
- c. Humidity resistance: Anti-sag, suitable for high humidity application.
- d. Light Reflectance Coefficient: Not less than 0.80.

- f. Ceiling Attenuation Class: 40
- g. Exposed Finish: vinyl faced membrane
 - 1) Color: White.
- i. Suspension Grid Type: Prelude XL
- k. Edge/Joint Detail: Square edge, lay-in.
- l. Axiom perimeter trim at all floating edges 6" high.
- m. Broad Spectrum Anti-microbial Fungicide & Bactericide Treatment. Provide factory applied standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

~~2. Acoustical Ceiling Tile ACT-1B; Sanitary and Special Use-Armstrong World Industries:-
KITCHEN ZONE #673-Basis of Design for Culinary Arts Lab area-~~

~~ALTERNATE BID-NOT USED~~

- ~~a. Size: as shown on reflected ceiling plans by 5/8 inch thick.~~
- ~~b. Material: wet-formed mineral fiber~~
- ~~e. Humidity resistance: Anti-sag, suitable for high humidity application.~~
- ~~d. Light Reflectance Coefficient: Not less than 0.89.~~
- ~~f. Ceiling Attenuation Class: 33~~
- ~~g. Exposed Finish: factory applied latex paint

 - 1) Color: White.~~
- ~~i. Suspension Grid Type: Prelude XL~~
- ~~k. Edge/Joint Detail: Square edge, lay-in.~~
- ~~l. Axiom perimeter trim at all floating edges 6" high.~~
- ~~m. Broad Spectrum Anti-microbial Fungicide & Bactericide Treatment. Provide factory applied standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram positive and gram negative bacteria and showing no mold, mildew or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.~~

- 3. Acoustical Ceiling Tile ACT-2; General Use-Armstrong Industries: Fine Fissured #1714-
Basis of Design for general areas
 - a. Size: as shown on reflected ceiling plans by 3/4 inch thick.
 - b. Material: wet-formed mineral fiber, fine fissured medium texture, white latex.
 - c. Humidity resistance: Anti-sag, suitable for high humidity application.
 - d. Light Reflectance Coefficient: Not less than 0.85.
 - e. NRC: not less than 0.70
 - f. Ceiling Attenuation Class: not less than 35-40
 - g. Exposed Finish: factory applied latex paint
 - 1) Color: White.
 - h. Suspension Grid Type: Prelude XL
 - i. Edge/Joint Detail: Square edge, lay-in.
 - j. Broad Spectrum Anti-microbial Fungicide & Bactericide Treatment. Provide factory applied standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.2 GRID

- A. Manufacturers: Provide one of the following:
1. Armstrong World Industries – Basis of Design.
 2. USG Interiors.
 3. BPB.
 4. Chicago Metallic Corporation.
 5. Or approved equal.
- B. Grid Types
1. Steel Grid Units for Suspended Grid SG-1: Where grid of this designation is indicated in acoustical panel ceiling schedule provide exposed tee system complying with the following:
 - a. Approved for application in Seismic Zone 2.
 - b. Size: 15/16 inch face dimension.
 - c. Material: hot-dipped galvanized steel.
 - d. Exposed Finish: Baked polyester paint. white
 - e. Color: Selected by Architect from manufacturer's full range of available colors.
 - f. Products: Available products include the following:
 - 1) Prelude XL-white; Armstrong World Industries, Inc.
- C. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.
- D. Metal Suspension Systems shall be approved for installation complying with requirements for Seismic Zone 2.
- E. 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.
1. High-Humidity Finish: Comply with ASTM C 635 requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.
- F. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.
1. Post-installed 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, conducted by a qualified testing and inspecting agency.
 - a. Type: Post-installed expansion anchors.
 2. Post-installed Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching 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.

- G. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
 - 1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
 - 2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than diameter wire.
- H. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
- I. Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material and finish as that used for exposed flanges of suspension system runners.
 - 1. 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.
 - 2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
- J. Hold-Down Clips for Non-Fire-Resistance-Rated Ceilings: For interior ceilings consisting of acoustical panels weighing less than, provide hold-down clips spaced o.c. on all cross tees.

2.3 ACCESSORIES

- A. Acoustic Batt Insulation: ASTM C665, friction fit type, unfaced; 2 inch thick, size cut to fit acoustic system.
- B. Acoustic Sealant: Non-hardening, non-skinning type.
- C. Touch-up Paint: Type and color to match acoustic and grid units.

2.4 DRYWALL/GYPSUM BOARD FRAMING SYSTEM

- A. Manufacturers: Provide one of the following:
 - 1. Armstrong World Industries – Basis of Design.
 - 2. USG Interiors.
 - 3. BPB.
 - 4. Chicago Metallic Corporation.
 - 5. Or approved equal.
- B. Ceiling/soffit surfaces ½" gypsum board with recessed lighting.
- C. Location and span lengths as indicated on drawings.
- D. Framing system shall comply with the requirements of Seismic Zone 2.
- E. Metal framing System: Provide manufacturer's standard attached metal frame system.

- F. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.
1. Post-installed anchors in concrete: Anchors of type and material indicated below 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, conducted by a qualified testing and inspection agency.
 - a. Type: Post-installed expansion anchors.
 2. Post-installed Powder-Actuated Fasteners in concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capacity to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E1190, conducted by a qualified testing and inspection agency.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify layout of hangers will not interfere with other work.

3.2 INSTALLATION

- A. Lay-In Grid Suspension System:

1. Installation shall conform to all seismic criteria requirements
2. Install suspension system in accordance with ASTM C636.
3. Install system in accordance with ASTM E580.
4. Locate system on room axis as indicated on Drawings.
5. Install ceilings after major above ceiling work is complete. Coordinate location of hangers with other work.
6. Install hanger clips during steel deck erection. Install additional hangers and inserts as required.
7. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
8. Where ducts or other equipment prevent regular spacing of hangers, reinforce nearest affected hangers to span extra distance.
9. Do not support components on main runners or cross runners when weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner; or support components independently.
10. Do not eccentrically load system, or produce rotation of runners.
11. Perimeter Molding:
 - a. Install edge molding at intersection of ceiling and vertical surfaces into bed of acoustic sealant.
 - b. Use longest practical lengths.
 - c. Miter corners.
 - d. Install at junctions with other interruptions.
12. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement.

Maintain visual closure.

13. Install light fixture boxes constructed of gypsum board above light fixtures in accordance with UL assembly requirements and light fixture ventilation requirements.

B. Acoustic Units:

1. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.
2. Lay directional patterned units one way with pattern parallel to longest room axis. Fit border trim neatly against abutting surfaces.
3. Install units after above ceiling work is complete.
4. Install acoustic units level, in uniform plane, and free from twist, warp, and dents.
5. Cutting Acoustic Units:
 - a. Cut to fit irregular grid and perimeter edge trim.
 - b. Cut edges to match factory finished edges.
 - c. Double cut and field paint exposed edges of tegular units.
6. Where round obstructions occur, install preformed closures to match perimeter molding.
7. Lay acoustic insulation for distance of 48 inches on both sides of acoustic partitions as indicated on Drawings.
8. Install hold-down clips to retain panels tight to grid system within 20 ft of exterior door.

C. Glue-up application:

1. Follow all manufacturer's directions on the adhesive packaging.
2. As the tile is pressed to the ceiling, the adhesive will spread and cover an area of approximately 3" across and 1/8" to 3/16" thick. Acoustical tile adhesive is recommended, Henry #237 Acousti-Gum.
3. Do not 'butter' too many tiles in advance, as a skin will form on the adhesive dabs and weaken the bond.
4. Level tile by inserting a 1/16" thick fiber spline approximately 3" long at each corner (works out to one spline for every tile.)
5. Use a 48" to 72" straight edge and press to the face of the installed tile to help level the ceiling.
6. Provide perimeter edge trim, Armstrong slip-on wall molding. These moldings are 10'-0" long and have a 15/16" flange.
7. Do not bend tile during installation. The spring-load will cause the adhesive to release.
8. Do not use warped tiles because the adhesive will release.
9. On surfaces that were previously tiled, do not place adhesive on top of old adhesive.

D. Drywall/Gypsum Board Framing System:

1. Installation shall conform to all seismic criteria requirements
2. Install system in accordance with ASTM E580.
3. Locate system on room axis as indicated on Drawings.
4. Install ceilings after major above ceiling work is complete. Coordinate location of hangers with other work.
5. Install framing system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
6. Where ducts or other equipment prevent regular spacing of framing, reinforce nearest affected hangers to span extra distance.
7. Install light fixture boxes, if required, constructed of gypsum board above light fixtures in accordance with UL assembly requirements and light fixture ventilation requirements.

3.3 ERECTION TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION 09 51 00

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Resilient base.
 2. Resilient stair accessories.
 3. Resilient molding accessories.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. LEED Submittals:
1. Product Data for Credit IEQ 4.1: For adhesives, documentation including printed statement of VOC content.
 2. Laboratory Test Reports for Credit IEQ 4.1: For adhesives, documentation indicating that products 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."
 3. Product Data for Credit IEQ 4.3: For adhesives, documentation including printed statement of VOC content.
 4. Product Data for Credit IEQ 4.3: For resilient stair accessories, documentation from an independent testing agency indicating compliance with the FloorScore standard.
 5. Laboratory Test Reports for Credit IEQ 4.3: For resilient stair accessories, documentation indicating that products 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."
- C. Samples: For each exposed product and for each color and texture specified, not less than 12 inches long.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. FloorScore Compliance: Resilient base and stair accessories shall comply with requirements of FloorScore certification.

- B. Low-Emitting Materials: Flooring system 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 THERMOSET-RUBBER BASE VB

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Burke Mercer Flooring Products, Division of Burke Industries Inc.
 - 2. Johnsonite
 - 3. Flexco.
 - 4. Roppe Corporation, USA.
- B. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
 - 1. Style and Location:
 - a. Style A, Straight: Provide in areas with carpet
 - b. Style B, Cove: Provide in areas with resilient flooring
- C. Thickness: 0.125 inch.
- D. Height: As indicated on Drawings.
- E. Lengths: Coils in manufacturer's standard length
- F. Outside Corners: Job formed or preformed.
- G. Inside Corners: Job formed or preformed.
- H. Colors: As selected by Architect from full range of industry colors.

2.3 RUBBER STAIR ACCESSORIES

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AB; American Biltrite.
 - 2. Allstate Rubber Corp.
 - 3. Armstrong World Industries, Inc.
 - 4. Burke Mercer Flooring Products, Division of Burke Industries Inc.
 - 5. Flexco.

6. Johnsonite; A Tarkett Company.
7. Mondo Rubber International, Inc.
8. Musson Rubber Company.
9. Nora Systems, Inc.
10. PRF USA, Inc.
11. R.C.A. Rubber Company (The).
12. Roppe Corporation, USA.
13. VPI, LLC, Floor Products Division.

C. Stair Treads: ASTM F 2169.

1. Type: TP (rubber, thermoplastic).
2. Class: [1 (smooth, flat)] [2 (pattern; embossed, grooved, or ribbed)].
3. Group: [1 (embedded abrasive strips)] [2 (with contrasting color for the visually impaired)].
4. Nosing Style: [Square, adjustable to cover angles between 60 and 90 degrees] [Square] [Round].
5. Nosing Height: 2 inches
6. Thickness: 1/4 inch and tapered to back edge.
7. Size: Lengths and depths to fit each stair tread in one piece or, for treads exceeding maximum lengths manufactured, in equal-length units.
8. Integral Risers: Smooth, flat; in height that fully covers substrate.

D. Separate Risers: Smooth, flat; in height that fully covers substrate; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.

1. Style: Toeless, by length matching treads.
2. Thickness: Manufacturer's standard

E. Landing Tile: Matching treads; produced by same manufacturer as treads and recommended by manufacturer for installation with treads

F. Locations: Provide rubber stair accessories in areas indicated

G. Colors and Patterns: As selected by Architect from full range of industry colors

2.4 RUBBER MOLDING ACCESSORY

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

1. Roppe Corporation, USA.
2. VPI, LLC, Floor Products Division.
3. Johnsonite

B. Description: Rubber stair-tread nosing, cap for cove carpet, cap for cove resilient flooring, carpet bar for tackless installations, carpet edge for glue-down applications, nosing for carpet, nosing for resilient flooring, reducer strip for resilient flooring, joiner for tile and carpet, transition strips.

- C. Profile and Dimensions: As indicated
- D. Locations: Provide rubber molding accessories in areas indicated
- E. Colors and Patterns: As selected by Architect from full range of industry colors

2.5 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 manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
 - 1. Adhesives shall have a VOC content of 50 g/L or less except that adhesive for rubber stair treads shall have a VOC content of 60 g/L or less.
 - 2. Adhesives 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."
- C. Stair-Tread Nose Filler: Two-part epoxy compound recommended by resilient stair-tread manufacturer to fill nosing substrates that do not conform to tread contours.
- D. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient stair-tread manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Accessories: Prepare horizontal surfaces according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than **10** pH.
 - 4. Moisture Testing: Proceed with installation only after substrates pass testing according to manufacturer's written recommendations, but not less stringent than the following:

- a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
 - b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have maximum **75** percent relative humidity level.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
 - D. Do not install resilient products until they are the same temperature as the space where they are to be installed.
 - E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.2 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Preformed Corners: Install preformed corners before installing straight pieces.
- H. Job-Formed Corners:
 - 1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Form without producing discoloration (whitening) at bends.
 - 2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
 - a. Miter or cope corners to minimize open joints.

3.3 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Stair Accessories:
 - 1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
 - 2. Tightly adhere to substrates throughout length of each piece.
 - 3. For treads installed as separate, equal-length units, install to produce a flush joint between units.
- C. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Floor Polish: Remove soil, visible adhesive, and surface blemishes from resilient stair treads before applying liquid floor polish.
 - 1. Apply three coat(s).
- C. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

SECTION 09671 - RESINOUS FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. General-use epoxy-resin flooring.
 - a. Type RF-1 – 1/8" thick
- B. Related Sections include the following:
 - 1. Division 1 Section LEEDS Requirements.
 - 2. Division 3 Section 03300 "Cast-in-Place Concrete" for concrete substrates to receive resinous flooring.
 - 3. Division 3 Section 03532 "Concrete Toppings" for concrete toppings applied over base concrete slabs to receive resinous flooring.
 - 4. Division 7 Section 07920 "Joint Sealants" for joint-sealant materials and installation of sealant materials at joints in resinous flooring systems.

1.3 SUBMITTALS

- A. Product Data: For each type of product specified. Include manufacturer's technical data, installation instructions, and recommendations for each resinous flooring component required.
- B. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors, textures, and patterns available for each resinous flooring system indicated.
- C. Samples for Verification: Of each resinous flooring system required, square, applied by Installer for this Project to a rigid backing, in color, texture, and finish indicated. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.
- D. Product Schedule: Use designations indicated in the Resinous Flooring Schedule and room designations indicated on Drawings in product schedule.
- E. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
- F. Material Test Reports: From a qualified independent testing agency indicating and interpreting test results of the resinous flooring's reaction to chemicals and other reagents and substantiating compliance with requirements.

- G. Material Certificates: In lieu of material test reports, when permitted by Architect, signed by manufacturers certifying that materials furnished comply with requirements.
- H. Maintenance Data: For resinous flooring to include in the maintenance manuals specified in Division 1.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer (applicator) who has specialized in installing resinous flooring similar in material, design, and extent to that indicated for this Project and who is acceptable to resinous flooring manufacturer.
 - 1. Engage an installer who employs only persons trained and approved by resinous flooring manufacturer for installing resinous flooring systems specified.
- B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, and sealing or finish coats, through one source from a single manufacturer. Provide secondary materials including patching and fill material, joint sealant, and repair materials of type and from source recommended by manufacturer of primary materials.
- C. Fire Performance: Where indicated, provide materials and construction for resinous flooring identical to those whose fire performance has been determined per MIL-STD-1623, as specified in MIL-D-3134, by a testing and inspecting organization or by another means acceptable to authorities having jurisdiction.
- D. Testing Agency Qualification: To qualify for acceptance, an independent testing agency must demonstrate to Architect's satisfaction, based on evaluation of agency submitted criteria conforming to ASTM E-699, that it has the experience and capability to conduct satisfactorily the testing indicated without delaying the progress of the work.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.
- B. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring installation.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring installation.

- C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period. Restrict non-essential traffic for remainder of construction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products indicated for each designation in the Resinous Flooring Schedule at the end of Part 3.

2.2 MATERIALS

- A. Resinous Flooring: Resinous floor surfacing system consisting of primer; body coat(s) including resin, hardener, selected fine aggregates, and colorants, if any; and sealing or finish coats. Comply with requirements indicated in the Resinous Flooring Schedule.
 1. Waterproofing Membrane: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.
 2. Reinforcing Membrane: Manufacturer's flexible resin recommended for crack isolation to help prevent substrate cracks from reflecting through resinous flooring.
 - a. Provide fiberglass scrim embedded in reinforcing membrane.
- B. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.
- C. Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. General: Prepare and clean substrate according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry, and neutral substrate for resinous flooring application.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
 1. Comply with ASTM C 811 requirements, unless manufacturer's written instructions are more stringent.
 2. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 3. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations, abrading the concrete surface to obtain optimum bond of epoxy to concrete.

- C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions. Leave surface free of dust, dirt, laitance and efflorescence.
- D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
- E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations.
- F. 1.Care must be taken at all construction joints and other saw cut joints. This project has radon treatment and **all** open joints must be caulked. Cover these joints with manufacturers approved material.

3.2 APPLICATION

- A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
 - 1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate and optimum intercoat adhesion.
 - 2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
 - 3. At substrate expansion and isolation joints, provide joint in resinous flooring to comply with resinous flooring manufacturer's written recommendations.
 - a. Apply joint sealant to comply with manufacturer's written recommendations.
- B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.
- C. Apply waterproofing membrane on 2nd and 3rd. floor applications, in manufacturer's recommended thickness.
 - 1. Apply waterproofing membrane to integral cove base substrates.
- D. Apply reinforcing membrane to substrate cracks.
- E. Apply reinforcing membrane to entire substrate surface.
- F. Apply self-leveling slurry body coat(s) in thickness indicated.
 - 1. Broadcast aggregates and, after resin is cured, remove excess aggregates to provide surface texture indicated.
- G. Apply troweled or screeded body coat(s) in thickness indicated. Hand or power trowel and grout to fill voids. When cured, sand to remove trowel marks and roughness.
- H. Built-up with underlayment similar to DEX-0-TFX 81 or approved equal. Provide 1/16" pitch to floor drains within rooms
- I. Integral Cove Base: Apply cove base mix to wall surfaces at locations indicated. Round internal and external corners. Install cove base according to manufacturer's written instructions and details including taping, mixing, priming, troweling, sanding, and top coating of cove base.

- J. Apply sealing or finish coat(s), including grout coat of type recommended by resinous flooring manufacturer to produce finish indicated. Apply in number of coats and at spreading rates recommended in writing by manufacturer.

3.3 FIELD QUALITY CONTROL

- A. Core Sampling: At the direction of Owner and at locations designated by Owner, take 1 core sample per of resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take 2 additional samples. Repair damage caused by coring and correct deficiencies at no additional cost to Owner.

3.4 CLEANING AND PROTECTING

- A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.
- B. Clean resinous flooring not more than 4 days before dates scheduled for inspections intended to establish date of Substantial Completion in each Project area. Use cleaning materials and procedures recommended in writing by resinous flooring manufacturer.

3.5 RESINOUS FLOORING SCHEDULE

- A. Resinous Flooring RF-1: Provide and install resinous flooring to nominal finish thickness of 1/8 inch where indicated except in all kitchens and cafeteria serving areas.
 - 1. Products: Provide products of one of the following manufacturers:
 - a. "DecorFlor" with "Descide"; Dex-o-Tex International Inc.
 - b. "PaliKrom 125"; Palma, Inc.
- B. Color and Pattern: As selected by Architect from manufacturer's full range of colors and patterns produced for resinous flooring complying with requirements indicated.
 - 1. System Thickness: Wearing Surface: Antislip.
 - 2. Base: 6" high integral cove base.
 - 3. Components: Provide manufacturer's standard components complying with requirements, unless otherwise indicated. Provide the following optional components:
 - a. Primer.
 - b. Waterproofing membrane where indicated.
 - c. Reinforcing membrane where indicated.
 - 4. Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to standard test methods indicated.
 - a. Compressive Strength: 6,000 psi per ASTM C 579.
 - b. Tensile Strength: 1,500 psi per ASTM C 307.
 - c. Flexural Modulus of Elasticity: 500,000 psi per ASTM C 580.
 - d. Water Absorption: 1.0 percent maximum per ASTM C 413.
 - e. Coefficient of Thermal Expansion: 0.00004 inch per inch deg. F per ASTM C 531.
 - f. Indentation: 7.0 percent maximum per MIL-D-3134.
 - g. Impact Resistance: No chipping, cracking, or delamination and not more than permanent indentation per MIL-D-3134.

- h. Resistance to Elevated Temperature: No slip or flow of more than per MIL-D-3134.
 - i. Slip Resistance: 0.5 minimum per ASTM C1028.
 - j. Flammability: Self-extinguishing per ASTM D 635.
5. Chemical Resistance: Test specimens of cured resinous flooring system are unaffected when tested according to ASTM C 267 for immersion in the following reagents for not less than 7 days:
- a. Acetic Acid 5 percent and Glacial
 - b. Acetone
 - c. Ammonium Hydroxide 10 percent and Concentrated
 - d. Ammonium Nitrate 50 percent
 - e. Benzene
 - f. Butyl Alcohol
 - g. Calcium Chloride 30 percent
 - h. Carbon tetrachloride
 - i. Caustic Acid 10 percent and 30 percent
 - j. Chloroform
 - k. Chromic Acid 20 percent
 - l. Citric Acid 10 percent
 - m. Coffee
 - n. Cola
 - o. Detergent Solution, Heavy-duty
 - p. Diethyl Ether
 - q. Ethyl Alcohol 50 percent and 95 percent
 - r. Ethylene Glycol
 - s. Ferric Chloride 10 percent
 - t. Formaldehyde 10 percent
 - u. Formic Acid 20 percent
 - v. Gasoline
 - w. Germicidal Solution
 - x. Glycerine
 - y. Hydraulic Fluid
 - z. Hydrochloric Acid 10 percent and 20 percent
 - aa. Hydrofluoric Acid 40 percent
 - bb. Hydrogen Peroxide Solution 3 percent and 28 percent
 - cc. Iodine
 - dd. Isopropyl Alcohol
 - ee. Jet Fuel
 - ff. Kerosene
 - gg. Lactic Acid 10-50 percent
 - hh. Merthiolate
 - ii. Methyl Alcohol
 - jj. Methyl Ethyl Ketone
 - kk. Methylene Chloride
 - ll. Mineral Oil
 - mm. Mineral Spirits
 - nn. Mustard
 - oo. Nitric Acid 10 percent and 40 percent and Concentrated
 - pp. Oil, motor
 - qq. Oil, Transformer
 - rr. Phenol 5 percent
 - ss. Phosphoric Acid 10-80 percent and Concentrated

- tt. Salad Oil
- uu. Silver Nitrate 10 percent
- vv. Sodium Carbonate 2 percent and 20 percent
- ww. Sodium Chloride 10 percent
- xx. Sodium Hydroxide 10-60 percent
- yy. Sodium Hypochlorite
- zz. Sulfuric Acid 3-70 percent
- aaa. Syrup
- bbb. Toluene
- ccc. Trichlor Ethylene
- ddd. Urine
- eee. Xylene

END OF SECTION 09671

SECTION 09 91 00 - PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Surface preparation and field application of paints and other coatings.

1.2 SYSTEM DESCRIPTION

- A. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed rating when tested in accordance with ASTM E84.

1.3 SUBMITTALS

A. Shop Drawings:

1. Submit scale drawings illustrating traffic markings and colors to be used.

B. Product Data:

1. Submit data on all finishing products and coatings.

C. Samples:

1. Submit two paper chip samples, 3 x 3 inch in size illustrating range of colors and textures available for each surface finishing product scheduled.
2. Submit two painted samples, illustrating selected colors and textures for each color and system selected with specified coats cascaded. Submit on tempered hardboard, 6 x 6 inch in size.

D. Manufacturer's Installation Instructions:

1. Submit special surface preparation procedures, and substrate conditions requiring special attention.

1.4 OPERATION AND MAINTENANCE DATA

- A. Operation and Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

- B. Applicator: Company specializing in performing the work of this section with minimum three years documented experience.

1.6 PRE-INSTALLATION MEETING

- A. Convene minimum one week prior to commencing Work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Do not apply exterior coatings during rain or snow when relative humidity is outside the humidity ranges, or moisture content of surfaces exceed those required by the paint product manufacturer.
- C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- D. Minimum Application Temperature for Varnish and Stain Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candle measured mid-height at substrate surface.

1.9 WARRANTY

- A. As per section 01850 of NJSDA project manual.

1.10 EXTRA MATERIALS

- A. Supply 1 gallons of each color, type, and surface texture; store where directed.
- B. Label each container with color, type, texture, room locations, in addition to the manufacturer's label.

PART 2 - PRODUCTS

2.1 PAINTS AND COATINGS

- A. Manufacturers: Provide one of the following:
 - 1. Sherwin-Williams.
 - 2. Benjamin Moore.
 - 3. M. A. Bruder & Sons.
 - 4. F & H.
 - 6. Or approved equal.

2.2 COMPONENTS

- A. Coatings: Ready mixed, except field catalyzed coatings. Prepare coatings:
 - 1. To a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
 - 2. For good flow and brushing properties.
 - 3. Capable of drying or curing free of streaks or sags.
- B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified; commercial quality.
- C. Patching Materials: Latex filler.
- D. Fastener Head Cover Materials: Latex filler.

2.3 FINISHES

- A. Select paints from Manufacturer's full range of colors, finishes and tints.
- B. Refer to schedule at end of section for surface finish schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and substrate conditions are ready to receive Work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Test shop applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Plaster and Gypsum Wallboard: 12 percent.
 - 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
 - 3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
 - 4. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
 - 5. Concrete Floors: 8 percent.

3.2 PREPARATION

- A. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.
- B. Marks: Seal with shellac those which may bleed through surface finishes.
- C. Impervious Surfaces: Remove mildew by scrubbing with solution of tetra-sodium or tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

- D. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- E. Concrete Floors: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- F. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- G. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- H. Concrete and Concrete Masonry Unit Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry. Infill holes and prep surface to receive primer and paint finish.
- I. Plaster Surfaces: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- J. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand, power tool, wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- K. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Prime metal items including shop primed items.

3.3 APPLICATION

- A. Accent paint colors will be designed for various surfaces throughout the project. Accent colors may be designed for walls, soffits, woodwork, hollow metal frames, exposed steel, exposed concrete, etc. Contractor shall in no way assume that all interior wall surfaces in any given area will be painted one color. Contractor shall coordinate the application of multiple paint colors and shall include in his bid, "cutting in" between paint colors. Architect will schedule colors and locations on the "color drawings" which will be issued during the course of construction, following all finish material submissions.
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless specified otherwise.
- D. Sand wood and metal surfaces lightly between coats to achieve required finish.
- E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- F. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- G. Prime concealed surfaces of woodwork with primer paint.

- H. Prime concealed surfaces of interior wood surfaces scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with thinner.

3.4 FIELD QUALITY CONTROL

- A. Inspect and test questionable coated areas.

3.5 CLEANING

- A. Collect waste material which may constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.8 SCHEDULE - INTERIOR SURFACES - LATEX, LOW VOC

- A. Concrete Masonry Units - Semi-Gloss Finish

1. Sherwin Williams:
 - a. Filler Coat: Heavy duty Block Filler.
 - b. Finish: Two coats HealthSpec Latex Semi-Gloss B10.
2. Benjamin Moore:
 - a. Filler Coat: MoorCraft Int/Ext Block Filler 285.
 - b. Finish: Two Coats Pristine Latex Semi-Gloss 214.
3. MAB Paints:
 - a. Filler Coat: Block Kote #4000.
 - b. Finish: Two coats Enviro-Pure Latex Semi-Gloss, 047 line.
4. Or approved equal.

- D. Plaster and Gypsum Board: Semi-Gloss Finish:

1. Sherwin Williams:
 - a. Primer Coat: HealthSpec Primer B11W44
 - b. Finish: Two coats HealthSpec Latex Semi-Gloss B10.
2. Benjamin Moore:
 - a. Filler Coat: Pristine Latex Primer Sealer 211.
 - b. Finish: Two Coats Pristine Latex Semi-Gloss 214.
3. MAB Paints:
 - a. Primer Coat: Enviro-Pure Latex Primer 037-195.
 - b. Finish: Two coats Enviro-Pure Latex Semi-Gloss 047.
4. Or approved equal.

- E. Wood: Semi-Gloss Finish:

1. Sherwin Williams:
 - a. Primer Coat: HealthSpec Primer B11W44
 - b. Finish: Two coats HealthSpec Latex Semi-Gloss B10.
2. Benjamin Moore:
 - a. Filler Coat: Pristine Latex Primer Sealer 211.
 - b. Finish: Two Coats Pristine Latex Semi-Gloss 214.
3. MAB Paints:
 - a. Primer Coat: Enviro-Pure Latex Primer 037-195.
 - b. Finish: Two coats Enviro-Pure Latex Semi-Gloss 047.
4. Or approved equal.

- F. Ferrous Metal: Semi-Gloss Finish:

1. Sherwin Williams:
 - a. Primer Coat: DMT Acrylic Primer Finish
 - b. Finish: Two coats HealthSpec Latex Semi-Gloss B10.
2. Benjamin Moore:
 - a. Filler Coat: Retard X Latex Primer 162.
 - b. Finish: Two Coats Pristine Latex Semi-Gloss 214. SCHEDULE INTERIOR SURFACES - HIGH PERFORMANCE (WATER BASED EPOXY)
3. MAB Paints:
 - a. Primer Coat: Rust-O-Lastic Hydro Prime II 072-189.
 - b. Finish: Two coats Enviro-Pure Latex Semi-Gloss 047.
4. Or approved equal.

G. Concrete Masonry Units - Water Based Epoxy - Semi-Gloss:

1. Sherwin-Williams:
 - a. Filler: One coat Heavy Duty Block Filler (B42W46), 10.0-18.0 mils dry film thickness each coat.
 - b. Finish: Two coats Water Based Catalyzed Epoxy B70-200 Series, 2.5 mils dry film thickness each coat.
2. Tnemec:
 - a. Primer: One coat Envirofill Series 130.
 - b. Finish: One coat HB Tneme-Tufcoat Series 113; 4-6 mils dry film thickness per coat.
3. MAB Paints:
 - a. Filler: One coat Block Kote 2000 064-100.
 - b. Finish: Two coats Ply-Tile 530, 051 Line, 2.0 mils dry film thickness each coat.
4. Or approved equal.

3.10 WORKMANSHIP

- A. The workmanship shall be of the very best, all materials evenly spread and smoothly flowed on without runs or sags. Skilled mechanics shall be employed.
- B. All surfaces to be painted shall be cleaned free of loose dirt with a cloth or brushing with a stiff brush before painting, thoroughly dry and at proper temperature. All necessary putting of nail holes, cracks, etc. shall be done to match that of finish. Existing surfaces to be finished shall be prepared to receive the specified paint finish as recommended by paint manufacturer
- C. All metal surfaces shall be first washed with turpentine to remove any dirt or grease, before applying materials. Where rust appears, it shall be wire brushed or sandpapered clean before painting. All galvanized metal surfaces shall be treated with a solution of copper sulphate in one (1) gallon of water before applying the first coat.
- D. All woodwork and metal surfaces calling for enamel finish shall be sanded between coats with fine sandpaper to produce an even, smooth finish. All coats shall be perfectly dry before applying succeeding coats. Twenty-four (24) hours shall elapse between application of succeeding coats. Architect shall inspect sanded surfaces and approve same prior to commencing with finish coat.
- E. Finishes surfaces shall be of solid, even color and finish texture free from drips, runs, lumps, brush marks, discolorations and other defects. Repaint or refinish any painted or otherwise finished surfaces of doors, etc., which are cut in fitting. Do not paint any finished hardware

having plated finish.

- F. If surfaces to be finish cannot be put in proper condition for finishing by customary cleaning, sanding and puttying operations, the Contractor shall immediately notify the Architect in writing or assume responsibility for an unsatisfactory finish resulting.
- G. All materials used on the work shall be exactly as specified in brand and quality. No claim by the Contractor as to the unsuitability or unavailability of any material specified, or his inability to produce first-class work with same will be entertained.

3.11 CLEANING

- A. The Contractor shall, when so directed by the Architect, go over all portions of the building where he has worked, retouch where necessary and clean off paint spots from floors, walls, finish hardware, glass and other unpainted surfaces and leave all painted surfaces clean and in satisfactory condition.
- B. The Contractor shall remove from the premises all surplus and waste materials., empty containers and all debris resulting from this work.

3.12 PROTECTION

- A. The Painting Contractor shall not only protect his work at all times but shall also protect all adjacent work and materials by suitable covering or other methods during the progress of his work.

3.12 GUARANTEE

- A. All work shall be guaranteed against checking, cracking, peeling, chalking, discoloration or other defects due to improper materials or workmanship, due to improper preparation of the surface or due to the painting and finishing of surfaces which were not in proper condition to receive paint or painter's materials, and all such unsatisfactory work shall be refinished in accord with requirements of Guarantee of General Conditions.

3.13 REQUIREMENTS

- A. The Architect desires to emphasize that painting work requirements for this project are carefully noted herein and preparation of surfaces, sanding and completed job must be of the highest craftsmanship.

END OF SECTION 09 91 00

SECTION 099600 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and application of high-performance coating systems.
 - 1. Interior Substrates:
 - a. Concrete, horizontal surfaces.

1.2 DEFINITIONS

- A. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- B. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include preparation requirements and application instructions.
- B. LEED Submittals:
 - 1. Product Data for Credit EQ 4.2: For interior coatings, documentation including printed statement of VOC content.
 - 2. Laboratory Test Reports for Credit EQ 4: For interior coatings, documentation indicating that products 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. Samples: For each type of coating system and in each color and gloss of topcoat indicated.
- D. Product List: For each product indicated, include printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Coatings: **5** percent, but not less than 1 gal. of each material and color applied.

1.5 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each coating system indicated to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each coating system specified in Part 3.
 - a. Wall, Floor and Ceiling Surfaces: Provide samples of at least 100 sq. ft.
 - b. Other Items: Architect will designate items or areas required.
 - 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles for the paint category indicated.

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

- A. MPI Standards: Provide products that comply with MPI standards indicated and are listed in "MPI Approved Products List."
- B. Material Compatibility:
 - 1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a coating system, provide products recommended in writing by manufacturers of topcoat for use in coating system and on substrate indicated.
 - 3. Provide products of same manufacturer for each coat in a coating system.
- C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior coatings applied at project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 1. Flat Paints and Coatings: 50 g/L.
 - 2. Nonflat Paints and Coatings: 150 g/L.
 - 3. Primers, Sealers, and Undercoaters: 200 g/L.
 - 4. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: 250 g/L.
 - 5. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
 - 6. Pre-Treatment Wash Primers: 420 g/L.
 - 7. Floor Coatings: 100 g/L.

8. Shellacs, Clear: 730 g/L.
 9. Shellacs, Pigmented: 550 g/L.
- D. Low-Emitting Materials: Interior coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- E. Colors: As selected by Architect from manufacturer's full range

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - a. Concrete: 12 percent.
 - b. Masonry (Clay and CMU): 12 percent.
 - c. Wood: 15 percent.
 - d. Gypsum Board: 12 percent.
- B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- C. Proceed with coating application only after unsatisfactory conditions have been corrected.
1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.

3.3 APPLICATION

- A. Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

- B. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.4 CLEANING AND PROTECTION

- A. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.
- B. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.5 INTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. Concrete Substrates, Horizontal Surfaces.
 - 1. Clear Two-Component Polyurethane System:
 - a. Prime Coat: Varnish, aliphatic polyurethane, two-component (Gloss Level 6 or 7)[, **MPI #78**].
 - b. Intermediate Coat: Varnish, aliphatic polyurethane, two-component (Gloss Level 6 or 7)[, **MPI #78**].
 - c. Topcoat: Varnish, aliphatic polyurethane, two-component (Gloss Level 6 or 7)[, **MPI #78**].

END OF SECTION 099600

SECTION 101100 - VISUAL DISPLAY BOARDS

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. Marker boards.
 - 2. Tack boards.

1.3 DEFINITIONS

- A. Tack board: Framed or unframed, tackable, visual display board assembly.
- B. Visual Display Surface: Surfaces that are used to convey information visually, including surfaces of chalkboards, markerboards, tackboards, and surfacing materials that are not fabricated into composite panel form but are applied directly to walls.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for visual display surfaces.
- B. Shop Drawings: For visual display surfaces. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Show locations of panel joints.
 - 2. Include sections of typical trim members.
- C. Samples for Initial Selection: For each type of visual display surface indicated, for units with factory-applied color finishes, and as follows:
 - 1. Actual sections of porcelain-enamel face sheet and tackboard assembly.
- E. Samples for Verification: For each type of visual display surface indicated.
 - 1. Visual Display Surface: Not less than 8-1/2 by 11 inches, mounted on substrate indicated for final Work. Include one panel for each type, color, and texture required.
 - 2. Trim: 6-inch- long sections of each trim profile.
 - 3. Display Rail: 6-inch- long sections.

4. Accessories: Full-size Sample of each type of accessory.

F. Product Schedule: For visual display surfaces. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for surface-burning characteristics of fabrics.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For visual display surfaces to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Source Limitations: Obtain visual display surfaces from single source from single manufacturer.

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

1. Flame-Spread Index: 25 or less.

2. Smoke-Developed Index: 50 or less.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver factory-built visual display surfaces, including factory-applied trim where indicated, completely assembled in one piece without joints, where possible. If dimensions exceed maximum manufactured panel size, provide two or more pieces of equal length as acceptable to Architect. When overall dimensions require delivery in separate units, prefit components at the factory, disassemble for delivery, and make final joints at the site.

B. Store visual display surfaces vertically with packing materials between each unit.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install visual display surfaces until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Field Measurements: Verify actual dimensions of construction contiguous with visual display surfaces by field measurements before fabrication.

1. Allow for trimming and fitting where taking field measurements before fabrication might delay the Work.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Porcelain-Enamel Face Sheet: Manufacturer's standard steel sheet with porcelain-enamel coating fused to steel; uncoated thickness indicated.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Claridge Products and Equipment, Inc.
 - b. PolyVision Corporation; a Steelcase company.
 - c. Or approved equal.
 2. Gloss Finish: Gloss as indicated; dry-erase markers wipe clean with dry cloth or standard eraser.
- B. Plastic-Impregnated Cork Sheet: Seamless, homogeneous, self-sealing sheet consisting of granulated cork, linseed oil, resin binders, and dry pigments that are mixed and calendared onto fabric backing; with washable vinyl finish and integral color throughout[with surface-burning characteristics indicated].
- C. Hardboard: ANSI A135.4, tempered.
- D. Particleboard: ANSI A208.1, Grade M-1., that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- E. Fiberboard: ASTM C 208.
- F. Extruded Aluminum: ASTM B 221, Alloy 6063.
- G. Adhesives: Manufacturer's standard product that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 MARKERBOARD ASSEMBLIES

- A. Porcelain-Enamel Markerboards: Balanced, high-pressure, factory-laminated markerboard assembly of three-ply construction consisting of backing sheet, core material, and 0.021-inch-thick, porcelain-enamel face sheet with high -gloss finish.
 1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Claridge Products and Equipment, Inc.

- b. PolyVision Corporation; a Steelcase company.
 - c. Or approved equal.
2. Manufacturer's Standard Core: Minimum 1/4 inch thick, with manufacturer's standard moisture-barrier backing.
 3. Laminating Adhesive: Manufacturer's standard, moisture-resistant thermoplastic type.

2.3 TACKBOARD ASSEMBLIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following :
 1. Claridge Products and Equipment, Inc.
 2. PolyVision Corporation; a Steelcase company.
 3. Or approved.
- B. Plastic-Impregnated-Cork Tackboard: 1/4-inch- thick, plastic-impregnated cork sheet factory laminated to 1/4-inch- thick hardboard backing.

2.4 MARKERBOARD TACKBOARD ACCESSORIES

- A. Aluminum Frames and Trim: Fabricated from not less than 0.062-inch- thick, extruded aluminum; standard size and shape.
 1. Factory-Applied Trim: Manufacturer's standard.
- B. Marker pen 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 1 to 2 inches wide.
 2. End Stops: Located at each end of map rail.
 3. Map Hooks: Two map hooks for every 48 inches of map rail or fraction thereof.
 4. Flag Holder: One for each room.
 5. Paper Holder: Extruded aluminum; designed to hold paper by clamping action.

2.5 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, water-proof adhesive.
- B. Visual Display Boards: Factory assemble visual display boards unless otherwise indicated.

1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display boards at manufacturer's factory before shipment.

- 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, as indicated on approved Shop Drawings.
 - 2. Provide manufacturer's standard vertical-joint system between abutting sections of markerboards.
 - 3. Provide manufacturer's standard mullion trim at joints between marker boards tack boards 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 a neat, hairline closure.
 - 1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display units at manufacturer's factory before shipment.

2.6 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 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.

2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

2.8 VISUAL DISPLAY SURFACE SCHEDULE

- A. Visual Display Board: Factory assembled.
 - 1. Markerboard: Porcelain-enamel markerboard assembly.
 - a. Color: White.
 - 2. Corners: Square.
 - 3. Width: As indicated on Drawings.
 - 4. Height: As indicated on Drawings.
 - 5. Mounting Height: As indicated on Drawings.
 - 6. Factory -Applied Aluminum Trim: with clear anodic finish.
 - 7. Accessories:
 - a. Chalk tray: Solid type.

- b. Map rail with end stops map hooks and flag holder.
- B. Tack board: Factory assembled.
 - 1. Tack Surface: Plastic-impregnated-cork tack board assembly.
 - 2. Corners: Square.
 - 3. Width: As indicated on Drawings.
 - 4. Height: As indicated on Drawings.
 - 5. Mounting Height: As indicated on Drawings.
 - 6. Edges: Concealed by trim.
 - a. Factory -Applied Aluminum Trim: style, with clear anodic finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.
- B. Examine walls and partitions for proper preparation and backing for visual display surfaces.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair the performance of and affect the smooth, finished surfaces of visual display boards, including dirt, mold, and mildew.

3.3 INSTALLATION, GENERAL

- A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.
 - 1. Proposed Mounting Height: 37 inches above finished floor to top of chalktray. Tack board and marker board shall be at one elevation. **Prior to securing to wall surface, mounting heights must be approved by Owner in the field.**

3.4 INSTALLATION OF FACTORY-FABRICATED VISUAL DISPLAY BOARDS AND ASSEMBLIES

- A. Visual Display Boards: Attach concealed clips, hangers, and grounds to wall surfaces and to visual display boards with fasteners at not more than 16 inches o.c. Secure both top and bottom of boards to walls.

3.5 CLEANING AND PROTECTION

- A. Clean visual display surfaces according to manufacturer's written instructions. Attach one cleaning label to visual display surface in each room.
- B. Touch up factory-applied finishes to restore damaged or soiled areas.
- C. Cover and protect visual display surfaces after installation and cleaning.

END OF SECTION 101100

SECTION 101423 - PANEL SIGNAGE

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.

1.1 SUMMARY

- A. Section Includes:
1. Panel signs.
 2. Room-identification signs.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For panel signs.
1. Include fabrication and installation details and attachments to other work.
 2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
 3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.
- C. Samples for initial selection: For each type of sign assembly, exposed component, and exposed finish.
- D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
1. Panel Signs: Full -size Sample
 2. Room-Identification Signs: Full-size Sample.
- E. Sign Schedule: Use same designations specified or indicated on Drawings or in a sign schedule.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

PART 2 - PRODUCTS

2.1 PANEL SIGNS, GENERAL

- A. Regional Materials: Panel signs shall be manufactured within 500 miles of Project site.

2.2 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for signs.

2.3 SIGNS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. [ASI Sign Systems, Inc.](#)
 - 2. [iSIGN, Inc.](#)
 - 3. [Vomar Products, Inc.](#)
 - 4. Or approved equal
- B. Panel Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
 - 1. Surface Finish and Applied Graphics:
 - a. Integral Sheet Color: As selected by Architect from full range of industry colors.
 - 2. Flatness Tolerance: Sign Panel shall remain flat or uniformly curved under installed conditions as indicated and within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner.

2.4 PANEL-SIGN MATERIALS

- A. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

2.5 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:
 - 1. Use concealed fasteners and anchors unless indicated to be exposed.
- B. Adhesives: As recommended by sign manufacturer and that 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. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.

2.6 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
 - 1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
- B. Surface-Engraved Graphics: Machine engrave characters and other graphic devices into panel surface indicated to produce precisely formed copy, incised to uniform depth.
 - 1. Engraved Opaque Acrylic Sheet: Fill engraved graphics with manufacturer's standard enamel.
- C. Shop- and Subsurface-Applied Vinyl: Align vinyl film in final position and apply to surface. Firmly press film from the middle outward to obtain good bond without blisters or fishmouths.
- D. Signs with Changeable Message Capability: Fabricate signs to allow insertion of changeable messages as follows:
 - 1. For slide-in changeable inserts, fabricate slot without burrs or constrictions that inhibit function. Furnish initial changeable insert. Subsequent inserts are by Owner. Furnish two blank inserts for each sign for Owner's use.

2.7 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Directional Finishes: Run Grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.
- B. Verify that sign-support surfaces are within tolerances to accommodate plaques without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
 - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B. Room – Identification Signs and other Accessible Signage: Install in locations on walls as indicated and according to accessibility standard.
- C. Mounting Methods:
 - 1. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.
 - 2. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.
- D. Signs Mounted on Glass: Provide opaque sheet matching sign material and finish onto opposite side of glass to conceal back of sign.

3.3 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101423

SECTION 11 40 00 – FOOD SERVICE EQUIPMENT

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 GENERAL

- A. Raymond/Raymond Associates is herein identified as the Kitchen Consultant.
- B. Custom fabricated equipment must be built by a company continually in business for at least a 5-year period.
- C. Contract documents convey a method of construction for custom fabrication; however this may or may not be the appropriate method based on selected fabricators industry knowledge and standards. It will be the responsibility of the selected fabricator to interpret and apply appropriate methods of construction for full functionality of custom fabrication.

1.3 WORK INCLUDED

- A. Cooperate in every way with other contractors in order that whole installation may result in the highest grade possible.
- B. Only such valves, traps, faucets, shut-offs, reducing pressure valves, relief valves and other specialty items required within equipment and as hereinafter specified, included in this work.
- C. Make all necessary cut-outs and knock-outs where required on equipment to accommodate electrical receptacles, switches or other electrical outlets and equipment, together with such cut-outs as required for passage of gas or plumbing piping, etc.
- D. Stack and remove rubbish waste material, crating, etc., resulting from work and keep the premises clean at all times. Upon completion of the installation, thoroughly and finally clean all equipment ready for use.

1.4 POWER AVAILABLE

- A. Electric Voltage: 120/208/480 volt, 60 cycle, 1 & 3 ph.
- B. Water Pressure: Typical Food Service Equipment range 25 to 90 PSI, if required, pressure reducing valves provided by plumbing contractor.
- C. Water Temperature(s): 110°-120° Fahrenheit max at hand washing sinks, work sinks and preparation sinks.
120°-140° Fahrenheit max at 3-compartment pot sink, dishwashers and hose reel assembly.
110°-120° Fahrenheit max at cooking equipment with faucet assembly.
- D. Gas Pressure: Typical Food Service Equipment range 5” W.C. to 10” W.C., if required, a gas pressure reducing valve at main feed, prior to equipment connection, to be provided by plumbing contractor.

1.5 GENERAL CHARACTERISTICS OF EQUIPMENT

A. Electrically Operated

1. Electrically operated equipment: listed by Underwriters Labs., Inc.
2. Motors: up to and including 1/2 h.p., shall be 120/60/1\
3. Motors: over 1/2 h.p., 208/60/3, or as otherwise indicated
4. Ranges, food warmers, etc., over 1.5 k.w., 208/60/3, unless otherwise specified
5. Electrically heated equipment, etc., 1.5 k.w. and under, 120/60/1
6. 1 ph. electrical plug-in units with 3 wire cords; 3 wire cap
7. 3 ph. electrical plug-in units with 4 wire cords; 4 wire cap
8. Motor driven equipment: equipped with starting switch
9. Motors: equipped with overload protection
10. Wiring on fixtures, including operating switches and pilots, furnished by Kitchen Equipment Contractor.

B. Submit in writing to Architect and Food Service Consultant for approval, schedule showing proposed electrical characteristics of each piece of equipment and disconnect means provided.

C. Punch holes for, and install hood and walk-in cooler/freezer lights and concealed conduits. The interconnection of same, including control switch, wiring, etc., by Electrical Contractor.

1.6 WORK EXCLUDED FROM THIS DIVISION

A. The following work in conjunction with Food Service Installation, done by others.

1. Electrical Contractor
 - a. Make connections to all food service equipment as shown.
 - b. Furnish disconnect switches.
 - c. Interconnecting of all hood lights and control switches.
 - d. Interconnecting of control switches as required on equipment shown, and all other components which come as part of any equipment shown on plan.
2. Plumbing Contractor
 - a. Make hot and cold water waste and gas connections to all kitchen equipment shown, furnishing all necessary shut-offs, traps, grease traps, line runs, etc., and install all faucets, pot fillers, filters and pressure regulators, furnished by Kitchen Equipment Contractor.
 - b. Interconnecting of any and all other components that come as part of any other equipment shown.
 - c. Provide floor drains and floor sinks where shown and indirect piping to floor drains and floor sinks as indicated on drawings.
 - d. Review all manufacturer approved installation methods/ diagrams and comply for proper installation of equipment being furnished by Kitchen Equipment Contractor.
3. Ventilation Contractor
 - a. Furnish size, shape and location of vent collars for hood and make connections to these collars. Collars by Kitchen Equipment Contractor.
4. General Contractor
 - a. Provide and/or coordinate all work to the floors, walls, and ceiling of the space.
 - b. Provide wall blocking where required and as indicated K.E.C.

1.7 SUBCONTRACTORS

A. The name and addresses of all Subcontractors furnished to Architect/Owner and Food Service

Consultant at time of submitting shop drawings. Selection of Subcontractors must be approved by them; and if in their judgment any fail to prosecute work in strict accordance with drawings and contract, after due notice from Owner or his agent, shall discharge same, but this in no way releases Kitchen Equipment Contractor from his obligations and responsibility under the contract.

- B. Every Subcontractor bound by terms and provisions of the contract so far as applicable to his work. Nothing contained herein shall create any contractual relations between any Subcontractor and Owner.

Note: Kitchen Equipment Contractor fully responsible to Owner for acts and omissions of his Subcontractors.

1.8 SHOP DRAWINGS, ETC.

- A. Immediately upon award of Contract and within 4 weeks, submit to Architect/Owner and Food Service Consultant, 3 sets of drawings for approval. Submit 1/4" scale roughing drawings showing locations of plumbing, and electrical connections with all requirements indicated at point of connection; use of a legend or numbered connection plan will be cause for drawing rejection. Prior to fabrication, Kitchen Equipment Contractor shall submit to Architect for approval 3 sets 1/2" scale shop drawings showing plan, elevations and isometric views covering all items of work. Drawings to show dimensions and details of construction, installation and relations to adjoining and related work where same requires cutting or close fitting. Show reinforcement, anchorage, etc., required for complete installation. After correction and approval of above -- submit 6 sets for record, then afterwards as many additional copies as required by client.
- B. Submit in same manner as above, drawings showing masonry bases, depressed floors, positions of walls, requirements for ceiling hangers, wall blocking, and any and all special information necessary for complete and correct correlation of various trades and satisfactory installation of all equipment shown on drawings.
- C. Manufacturer's names, cuts, descriptive data, analysis of tests, rated capacities and other information necessary for approval of standard manufactured articles and equipment furnished to Architect/Owner and Food Service Consultant for approval before ordering or purchasing. This submission made in same manner as above. All cuts marked with item number, mechanical characteristics, accessories furnished and bound in folders.

1.9 GENERAL

- A. No machine or equipment acceptable from any manufacturer not having had equipment of approximately the same type and design as that specified operating successfully for at least 5 years. Machines installed for test purposes shall not come within the category of successful commercial operation.
- B. Architect and Food Service Consultant privileged to inspect material and fabrication at Kitchen Equipment Contractor's factory at any time.
- C. Before proceeding with shop work, Kitchen Equipment Contractor to verify all measurements at premises. Where required dimensions are not immediately obtainable and delay in waiting for these dimensions would cause work to be seriously delayed, the matter shall be referred to Architect for a decision. In obtaining measurements, Kitchen Equipment Contractor shall consider work requirements of other trades, and equipment designed and fabricated to provide

necessary clearance for surrounding and adjoining work.

- D. Kitchen Equipment Contractor responsible for making any and all necessary adjustments to complete his work in a workmanlike manner, as approved by Architect/Owner.
 - E. Dimensions as indicated on drawings and specifications are approximate, and are to be adjusted if and where necessary to suit job conditions and field measurements.
 - F. Tops of tables, shelves, tops and exterior panels of cabinets, counters, doors, drainboards, etc., to be constructed of a single sheet of metal. Where size of equipment requires more than 1 sheet of metal, sheets butt joined with joints continuously welded full length. No joints less than 18" from an edge or end of a piece of equipment. In addition, all joints shall have battens or stiffeners welded to jointed material, ground smooth and polished.
 - G. Appliances of rigid construction free from objectionable vibration and quiet in operation.
 - H. Electrical heating elements shall conform to latest standards of National Electrical Manufacturer's Association and Underwriters Labs., Inc., where applicable standards have been set up by such agencies.
 - I. Motors of ample power to operate machines for which designated under full load operating conditions without exceeding nameplate ratings. Horsepower requirements on driven equipment determined by manufacturer, based on normal operation of maximum capacity.
 - J. Motors drip-proof, splash-proof or totally enclosed type, having two-hour duty cycle and ball bearings (except small timing motors which may have sleeve bearings). All motors shall have windings impregnated to resist moisture. Motors located where adjacent to deposits of dust, lint, etc., totally enclosed type.
 - K. It is the responsibility of the K.E.C. to supply and mount all electrical outlets, switches, controls, etc. within table/counter back splashes, aprons, panels, etc. and to provide S.S. cover plates as required. Furthermore, it is the responsibility of the Electrical Contractor, in coordination with the Kitchen Equipment Contractor, to make final interconnections within table/counter interior to junction boxes, outlets, switches, controls, etc. for equipment indicated, if required.
- 1.10 STAINLESS STEEL (S.S.)
- A. Where S.S. is specified, it shall be Type 304, nickel bearing iron alloy, containing approximately 17.0% to 19% chromium, 8% to 10% nickel, not more than 0.2% carbon, and not more than 2.0% of other alloying elements; designed being austenitic (non-magnetic).
 - B. S.S. free from scale with all surfaces polished to a high commercial finish. All welding and exposed welds hereinafter specified, must be ground down and polished smooth to a #4 finish so that no evidence of welding will appear. Unexposed welds on underside of counter or tables ground smooth and treated with an acid solution to remove weld discoloration and oxidization and to arrest corrosion.
 - C. Undersides of all counters, work tables, sinks, drain boards, etc., after fabrication, to have one (1) heavy coat of sound deadening material applied as allowed by local codes.
 - D. Gauges for sheet iron and sheet metal, U.S. Standard.

- E. Rivets, welds, bolts, screws, nuts and washers to be steel except where brass or S.S. is fastened, in which case they shall be brass or S.S., respectively. Where dissimilar metals are fastened, welds, bolts, rivets, screws, nuts and washers, highest grade metal. Spacing and extent of welds, rivets, bolts and screws such as to insure suitable fastening and prevent bulging of metals fastened.

1.11 SANITATION

- A. All custom built equipment constructed in accordance with standard No. 2, 4 & 7 of National Sanitation Foundation Testing Laboratory, manufactured by a company approved by N.S.F. and carry their stamp of approval. Kitchen Equipment Contractor must have "Registered" numbered seal of N.S.F. approval.

1.12 OPERATING INSTRUCTIONS

- A. Kitchen Equipment Contractor shall leave all items of equipment in good, operating condition, and furnish the services of a "Qualified" competent manufacturer's representative to instruct Owner's employees in proper use and care of equipment. Representative on call for as long a period as is necessary to assure Owner that such instruction is thoroughly understood.
- B. Kitchen Equipment Contractor or his qualified manufacturer's representative, thereafter, shall make all necessary calls during warranty period. Kitchen Equipment Contractor must include this service in bid.

1.13 SAMPLES

- A. After Award of Contract, when requested, Kitchen Equipment Contractor shall supply Architect with samples of fabricated equipment, such as corner of table with a rolled or inverted "V" edge, corner of dish table, overshef, drawer assembly, table leg with foot and gusset, or as specifically requested.

1.14 GUARANTEE

- A. Kitchen Equipment Contractor shall guarantee, as part of the bid and/or contract, workmanship, material and equipment for a period of 1 year from date of equipment final install and project turnover to Owner, and shall remedy any defect due to faulty workmanship or materials which may appear within guarantee period.
- B. Manufacturer's operation and maintenance manuals on equipment, etc., turned over to the Owner in duplicate, bound in a folder and marked accordingly.

1.15 EQUIPMENT CONSTRUCTION AND STANDARDS

- A. Where initials S.S. are used, they refer to "stainless steel;" C.P. refers to "chrome plated;" N.I.C. refers to "not in contract;" G.I. refers to "galvanized iron;" F.D. refers to "floor drain", and F.S. refers to "floor sink."

1.16 WASTES AND OVERFLOWS

- A. Sinks to have DrainKing rotary stainless steel ball drain, Teflon seals, 2" outlet, brass housing to be chrome plated, S.S. strainer plate, Fisher tail piece with threaded connection Fisher #6129, rotary lever operated waste outlets and overflows, such as manufactured by Fisher Mfg. Co., installed by Kitchen Equipment Contractor.

1.17 WATER INLET LOCATION

- A. Located in all cases above the positive water level to prevent siphoning of liquid into water system. Wherever conditions require water inlet below such level, a suitable type of vacuum breaker shall be placed on fixture and form part of same to prevent such siphoning.
- B. All faucets furnished by Kitchen Equipment Contractor as specified. Traps furnished by Plumbing Contractor.

1.18 PITCH AND DRAINAGE

- A. Wherever a fixture is used with waste or drain outlet, surface shall have distinct pitch towards outlet. Drainboards and tables that contain or adjoin sinks shall have a definite pitch towards sinks. Where necessary, surfaces creased and grooved to give a definite pitch.

1.19 SINKS

- A. #14 gauge S.S. interior corners rounded to 1" radius horizontally and vertically, forming a cove in bottom. All joints butt edged. Sink sizes given, inside measurements.
- B. Bottom of each compartment creased to center and fitted with a rotary drain as described in section 1.16, hereinbefore specified. Waste lever not to protrude beyond body of sink. Sinks to have overflows installed by Kitchen Equipment Contractor.
- C. Overflow to consist of 1-1/2" chrome plated brass strainer plate, fitted in back of each compartment at proper level directly connected to waste outlet with 1-1/2" chrome plated brass pipe.
- D. Back of sink extended integrally approximately 12" above working level, back 2-1/4" on 45° angle towards rear and then flanged down 1" and punched to accommodate faucets.
- E. Front and both ends, unless otherwise specified and shown, finished on top edge, 3" above working level, with 1-1/2" diameter, 180° welded integral roll. Exterior corners rounded to a 2-1/2" radius, all integrally welded.
- F. Sinks and drainboards finished on front and back edges only and left with straight edge on ends, so that drainboards may be welded thereto, forming integral units with top edge of rolled rim curbing formed on one horizontal plane across front to unit though surfaces of drainboards pitched to sinks.
- G. Multiple compartment sinks divided with double wall #14 gauge S.S. partitions, all corners rounded same as corners in sinks, continuously welded in place.
- H. Back, bottom and front of one continuous piece with no overlapping joints or open spaces between compartments.

1.20 SINK BOWL BUILT INTO TABLE TOP

- A. Sink constructed integral with table top #14 gauge S.S. having all interior corners coved vertically and horizontally forming a cove in bottom. To have overflow, lever waste outlet, etc..., as hereinbefore specified for sinks in spec section 1.19.
- B. All joints butt edged and welded, ground and polished, so that no evidence of welding will

appear. All sink sizes inside measurements. Table top where shown, punched to receive deck type combination faucets, provided by Kitchen Equipment Contractor.

1.21 FAUCET AND BASKET DRAIN ASSEMBLY

- A. All pot and pan sinks, unless otherwise specified, furnished with (1) Fisher Mfg. Co. stainless steel #24589 pre-rinse unit 3/4", and (1) Fisher Mfg. Co. stainless steel #51209 faucet, 3/4" with 14" swing spout. Preparation sinks, unless otherwise specified, furnished with (1) Fisher Mfg. Co. stainless steel #60798 faucet, 1/2" with 12" swing spout. Built-in work sinks and similar type sinks, unless otherwise specified, furnished with Fisher Mfg. Co. stainless steel #57665 faucet, 1/2" with 12" swing spout. Hand sinks, unless otherwise specified, furnished with (1) Fisher Mfg. Co. stainless steel #58564 faucet, 1/2" with 6" swing spout. All faucet assemblies complete with mixing faucets, nipples, elbows, and backflow preventers for Plumbing Contractor to install and connect. All faucets specified to have standard wrist type handle, NO LEAD Stainless Steel construction, polished to mirror finish, internal stainless steel seats, two part swivel stems to prevent cross flow, ADA easy turn stems. All plumbing fixtures shall be certified CSA, ASME A112.18.1/CSA B125.1, AB1953/HSC 116875, Vermont Bill S152, NSF/ANSI 61 sec 9, annex F and G, NSF/ANSI 372 low lead content, ASTM F2324.
- B. Unless otherwise specified, all sinks shall be fitted with Fisher Mfg. Co. DrainKing waist valve #22306.

1.22 DRAINBOARDS

- A. #14 gauge S.S. full width of sink carried up approximately 12" at back and where adjacent to wall and finished same as heretofore described for back of sink, and having 3" high curbing at front and ends not adjacent to walls and finished with integral 1-1/2" diameter 180° roll, unless otherwise specified.
- B. Drainboards continuously welded to sinks.
- C. Drainboards 30" long or less shall have 1-1/2" #16 gauge S.S. tubular braces secured at underside near front and welded to S.S. gusset at leg anchor. All others to have legs and cross bracing with full length and width undershelf as specified for tables.

1.23 TABLES WITH S.S. TOPS

- A. Tops of #14 gauge S.S. 1 piece construction with all edges turned down into 2" integral 180° roll with all corners rounded to 2" radius forming a bullnosed corner. Corner welded and polished smooth.
- B. Table tops thoroughly cross braced with 4" x 1" S.S. channel stiffeners #14 gauge welded to underside. All cross braces spaced not over 24" on center.
- C. Table tops adjoining walls or adjacent equipment carried up approximately 6" and returned 1", down 1" at top and ends. Intersections of table top and raised edge coved to 1" radius. Where backsplash is exposed, it shall have finished S.S. back.
- D. It is the responsibility of the K.E.C. to supply and mount all electrical outlets, switches, controls, etc. within table/counter back splashes, aprons, panels, etc. and to provide S.S. cover plates as required. Furthermore, it is the responsibility of the Electrical Contractor, in coordination with the Kitchen Equipment Contractor, to make final interconnections within table/counter interior to junction boxes, outlets, switches, controls, etc. for equipment indicated,

if required.

1.24 LEGS AND CROSSRAILS

- A. 1-5/8" O.D. #14 gauge S.S. tubular-type with S.S. bullet shaped feet having minimum vertical adjustment of 1-1/2" without showing threading or adjusting bolts. Feet fully enclosed on bottom. Adjustment of feet by means of a threaded shank attached to foot and screwed into a properly secured threaded member inside of leg. Construction of leg such that it shall fit over shank of foot so no liquid or other material can work their way into legs or foot.
- B. Tops of legs attached to enclosed conical gussets of heavy gauge S.S. Gussets welded to #14 gauge S.S. 4" x 1" channels to underside on which they appear. Crossrails 1-1/2" O.D. #14 gauge S.S. coped and welded to legs approximately 10" A.F.F. or as specified.

1.25 NOT APPLICABLE

1.26 OVERSHELF – WALL TYPE

- A. #16 gauge polished S.S. with back edge turned up 2", remaining ends turned down in 1-1/2" diameter 180° roll with corners bullnosed welded, ground and polished.
- B. Shelves supported by #12 gauge S.S. cantilever brackets. Shelf spaced 1" from walls when in place and secured to same with C.P. toggle bolts. Undersides secured to brackets with concealed welded studs, nuts and washers. Brackets spaced approximately 42" on center.

1.27 UNDERSHELVES

- A. #16 gauge polished S.S. full length and width of table with all edges turned down into 2" wide channel. In way of table legs, shelf notched to fit contour of legs and fitted to same in neat, workmanlike manner to eliminate unsanitary crevices, fully welded, ground and polished.
- B. Undershelves reinforced on underside with welded 4" x 1" longitudinal channels of #14 gauge S.S. where applicable. All signs of welding on shelf surface removed.

1.28 DRAWERS

- A. Of #18 gauge S.S. all interior corners coved to a 1" radius both vertically and horizontally. All welds ground and polished to a uniform finish.
- B. Front of #14 gauge polished S.S. and will extend on both sides of drawer body to conceal slides, corners welded, ground and polished. Space between drawer front and body fully enclosed at bottom, back and both sides by means of a #20 gauge S.S. filler, spot welded to drawer front and body, to provide a fully sealed, vermin-proof enclosure. Drawer front provided with a 5" C.H.G. # P46-1010 S.S. pull handle fastened in place by means of a concealed screws.
- C. Drawer slides of #14 gauge S.S. fitted with 4 case hardened ball bearing rollers. Track attached to drawer is to have upper edge channel shaped to fit contour of roller rim to provide a positive drawer guide and prevent jarring. This drawer track firmly spot-welded to body. Outer track provided with auto stops to lock without the use of tools.
- D. Where specified, drawer provided with removable synthetic carving board. Carving board is to slide into enclosure under drawer made of #14 gauge S.S. and extending across underside of carving board, with both sides turned up and welded to slide assembly. The 2 sides provided

with #14 gauge S.S. angles with stops at rear fastened in place 1/8" above top surface of carving board to provide guide and storage compartment when carving board is not in use. Carving board is to measure approximately 21" x 21" x 1" thick.

- E. Tool drawer 20" x 20" x 5" deep, bread drawer 20" x 20" x 10" deep. All drawers to have 4 pin paracentric keyed-alike built-in locks same as sliding and hinged doors. C.P. where exposed.

1.29 NOT APPLICABLE

1.30 EXHAUST HOOD

- A. Exhaust Hood material, construction, etc. to be in conformance with IMC section 507.
- B. Dimensions approximately as shown on contract drawings and mounted at 80" A.F.F. to underside of hood. Final dimensions to be determined in field by Kitchen Equipment Contractor.
- C. Proper anchorages, etc..., installed in ceiling joists, slab, etc..., by Kitchen Equipment Contractor prior to final finish of ceiling.
- D. Body of #18 gauge stainless steel front, back and sides; straight as indicated on contract drawings. All joints to be flush welded. Where field joints occur, provide a pair of transverse frames, butted together and securely fastened following contour of hood structure.
- E. Bottom rim of hood attached to channel of #14 gauge STAINLESS STEEL with mitered welded corners and butted field joints. Cross section inside of channel to measure approximately 2-1/2" horizontally, flanged upward tightly against interior lining of hood.
- F. Above dishwashing machine, kettles and steamers or non-grease producing equipment, hood provided with sloped baffle at back arranged at 45° angle of #18 gauge stainless steel. Baffles to have sliding dampers of #16 gauge stainless steel mounted in #14 gauge stainless steel channel tracks. Each damper to have stainless steel handle fastened with concealed bolts.
- G. Above ranges, ovens, fryers, griddles, etc. or grease producing equipment, hood provided with built-in filters at back extending full length and arranged at an angle of 45° easily removable without use of tools. Filters to be approximately 20" x 20" x 2" thick, of STAINLESS STEEL and expanded metal construction or as further indicated on contract drawings. Filters set into #14 gauge STAINLESS STEEL filter frame, bottom of which is integrally installed with back of hood and grease gutter for easy cleaning. Quantity and size of openings in plenum chamber as indicated in contract documents.
- H. Hood(s) provided with STAINLESS STEEL hanger brackets, welded to top of hood, spaced not more than 36" on center.
- I. Section of hood below ceiling or soffit, enclosed with vertical facing of #18 gauge STAINLESS STEEL. Panels not to exceed 36" in width, easily removable where required, provided with recessed finger grip or similar. Where panels meet at vertical joints flanged inward 1" to form a hairline joint. Channel extended 2" beyond perimeter of hood and provided with concealed full length angle member of 2" x 2" x 3/16" G.I. with clips for bolting to hanger angles, spaced approximately 36" on center. Hanger angles attached to 2" x 2" x 3/16" angle frame fastened to ceiling slab. Panels held in place at ceiling with 2" x 2" x 1/8" STAINLESS STEEL angle trim all around.

- J. Hood(s) provided with recessed or flush vapor-proof LED light fixtures, approximately 12" X 12" style or 48" strip style, pre-mounted by manufacturer. Light fixture with bulb(s), as provided by specified exhaust hood manufacturer, refer to Part 2 Products. All wiring and interconnections by Electrical Contractor.
- K. All exhaust hood controls, switches, etc... to be mounted @ 48" AFF. This is to be the maximum height allowed.
- L. All wiring and interconnections for controls, switches, fans, solenoid, shunt trips, etc... by Electrical Contractor. This includes any requirements to and from remote panels, switches and control packages.
- M. Must be tested and comply with the most current codes (or per local jurisdiction) UL-710, International Mechanical Code (IMC), and NFPA 96.

1.31 NOT APPLICABLE

1.32 FIRE PROTECTION SYSTEM

- A. The system shall be a pre-engineered cartridge-operated type R-102 system utilizing Liquid Ansulex agent, with a Fixed Nozzle distribution network. It shall be furnished and installed in compliance with UL Standard 1254, UL Standard 300, NFPA 96-2008 and any prevailing statutes or codes including automatic shut-down of all cooking appliances per code section 44 of NFPA 17A-27-2002.
- B. System to provide connection to building Fire Alarm System per NFPA 17A; Section 3-2.1.5.
- C. Fire protection remote pull stations mounted @ 48" AFF, located 10 ft. minimum to 20 ft. maximum from exhaust hood(s).
- D. The extinguishing agent shall be a specifically formulated aqueous solution of organic salts contained in a S.S. tank with 3 gallons minimum capacity, and able to withstand test pressure of 330 PSI. A welded S.S. bracket shall be provided for mounting the tank.
- E. The regulator releases mechanism shall be capable of providing sufficient expellant gas to discharge enough agent to meet the minimum nozzle discharge requirements. The mechanism shall have a visual indicator of "fired" condition. This mechanism shall be capable of being operated by fusible link detection, remote manual release and local manual release. The mechanism should be housed in a S.S. enclosure with cover containing identifications thereon.
- F. Each discharge nozzle to be listed with UL approval for placement and size. Each nozzle shall have a rubber blow-off cap to keep the nozzle tip orifice free of cooking grease build-up. All exposed piping to be chrome plated finish, and there shall be no exposed threads.
- G. Kitchen Equipment Contractor to furnish mechanical (electrical) gas valve, up to 3" in size and coordinate the install/provisions to shut-off all fuel supplies to all cooking appliances beneath Type I exhaust hood upon activation of system. If electrical gas valve is to be utilized, Kitchen Equipment Contractor to furnish reset relay push button.

It is the responsibility of the Plumbing Contractor to install, coordinate and make any provisions necessary for complete operation of gas valve.

It is the responsibility of the Electrical Contractor to furnish and install electrical wiring, relays,

etc... and make any provisions necessary for complete operation of gas valve. In addition, Electrical Contractor to furnish and install automatic equipment necessary to shut-off all electric beneath Type I exhaust hood upon activation of system.

- H. Kitchen Equipment Contractor to furnish and install a Class K Fire Extinguisher, dedicated to each room where a Type I exhaust hood is installed.
- I. Upon completion of installation, the installer to perform a wet chemical test or at the time of the test, the authority having jurisdiction may allow the Contractor to use flushing concentrate and water solution. However, whichever is permitted, it must be in compliance with Code. This test shall activate the entire system, except the agent supply tank, which will be substituted by the test tank of like pressure and size. Following a satisfactory test, the original tank shall be replaced. The system shall then be certified to be in working order and all authorities shall be so advised in writing. Provide Owner with copies of all satisfaction/acceptance tests.
- J. The system to be furnished and installed by a factory distributor in accordance with the manufacturer's instructions. This shall include mounting of the system units, manual releases, nozzles, actuating devices, and the running of all pipe and control tubing applicable to the R-102 system. If and when requested, submittal drawings concerning the fire system shall have affixed the seal and signature of a licensed engineer for the State in which they are to be installed. A 1-year service contract and maintenance program to be provided.
- K. Kitchen Equipment Contractor is required to submit a copy of the hood suppression system shop drawing to the local authority having jurisdiction for approval, as well as submission to the Architect. In addition, shop drawings when submitted, must be signed and sealed by an engineer licensed to practice in the State where the system is to be installed.

1.33 DISH TABLES – SOILED AND CLEAN

- A. #14 gauge polished S.S. with exposed edges finished in 3" high curbing with a 1-1/2" diameter, 180° rolled trim at top, corners bullnosed, welded. Where adjacent to wall, top carried up 12" integrally at top and ends. All joints in top welded and free of buckles and weld marks. When applicable, where top (also raised back), adjoins dishwashing machine, same flanged down 1" into machine and secured water tight, backsplash in this area brought forward diagonally to machine to form a baffle. Tops thoroughly cross braced with 4" x 1" channel stiffeners of #14 gauge S.S. and welded to underside. Cross bracing approximately 24" on center, running front to back. All corners in top rounded to 1" radius, vertically and horizontally.

1.34 NOT APPLICABLE

1.35 NOT APPLICABLE

1.36 NOT APPLICABLE

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- 1.49 NOT APPLICABLE

1.50 REFRIGERATORS AND REFRIGERATION UNITS

- A. Reach-in refrigerators, freezers, and refrigerated units, as shown unless otherwise specified, furnished by Kitchen Equipment Contractor. They shall meet all requirements as set forth for individual item number and complete with self-contained or remote compressors and motors. Cooling coils blower type, unless otherwise called for, provided with initial charge of approved CFC free refrigerant. Plumbing Contractor responsible for extending refrigerator drain line, where required, to spill into adjacent floor drain in approved manner. Extended drain line not less than 3/4" I.D. and C.P. or S.S. tubing.
- B. All refrigerated equipment, refrigerators and freezers, whether walk-in or reach-in, started and adjusted to maintain required temperatures, charged with approved refrigerant as required.
- C. All reach-in refrigerators, freezers, hot food warmers, etc., to have keyed-alike locks. Kitchen Equipment Contractor must request this at time of placing order to avoid correction at a later date at Kitchen Equipment Contractor's expense.
- D. Kitchen Equipment Contractor to provide 1 year's free service for all types of refrigerators and refrigeration equipment. Service to include all compressors, unit coolers, controls, etc., to include adjustments and repairs, irrespective of cause, whether mechanical, operational or manufacturing at no additional cost to Owner. Additionally, five (5) year warranty provided on all compressors, parts only or replacement.

~~1.51 WALK-IN COOLER AND FREEZER~~ N.I.C.

- A. General Description: To be N.S.F. approved units, of size and manufacturer as indicated on contract drawings, 8'-6" high, unless otherwise specified, completely furnished and assembled unit installed in an approved manner. As indicated on drawing, either installed into a 6-1/2" depressed floor area with flush type door sill and floor finish as shown on contract drawings, or installed directly on floor with interior ramp, and pre-fabricated aluminum floor with heavy duty structural underlayment floor, approximately 5,000 pounds per square feet of load. Where pre-fabricated floor with interior ramp indicated, unit to be finished with "First Choice" vinyl safety flooring provided and installed by Kitchen Equipment Contractor. Where depressed floor indicated, doors, floors, etc. to accommodate concrete-tile finished floors, provided and installed by G.C. after all boxes have been set in place. Walk-in freezers to maintain 0° to "minus" 10° Fahrenheit temperature. Walk-In coolers to maintain 35° to 36° Fahrenheit temperature.

- B. Finishes: Unexposed exterior of each unit to be .040 stucco aluminum finishes. All exposed exterior surfaces to be #20 gauge stucco S.S. finish. Interior, except floor, to be .040 stucco white aluminum finish. Floor as noted hereinbefore in spec section 1.51 A.
- C. Insulation:
1. Insulation shall be 4" thick rigid urethane foam, foamed-in-place to bond to inner surfaces of metal pans. Urethane foam to have a thermal conductivity (K factor) of not more than 0.118 BTU/hr./sq. ft. per degrees Fahrenheit/inch, and an overall coefficient of heat transfer (U factor) of not more than .029. The "R" factor shall be 34.
 2. (Optional) Prefabricated urethane foam panels shall be supplied with a Class 1 fire hazard classification according to ASTM-E-84 as tested by Factory Mutual System. Panels shall have a flame spread rating of 25 or less and a smoke density of no greater than 450°. Every panel shall bear a certifying Factory Mutual label.
 3. * These ratings are not intended to reflect hazards presented by this or any other material under actual fire conditions.
- D. Doors: Each walk-in shall be equipped with one standard 34"/36" x 78" hinged-type, flush mounted entrance door bearing the UL seal of approval, or of size as indicated on drawing. Each door section consists of a heavy reinforced steel "U" channel frame, foamed-in-place to give extra support and rigidity to the frame and to prevent racking, distortion, warping and twisting. Doors to be #20 gauge S.S. interior and exterior. Door and door panel sections to have 1/8" diamond tread kick plates, 36" high on interior and exterior. Walk-in entrance doors shall be equipped with a one-piece perimeter NSF approved PVC accordion type removable gasket. A magnetic core at top and side shall provide positive seal. An adjustable wiper gasket shall be mounted along the bottom edge of door. Door frames shall be provided with an LED light fixture, pilot light and switch assembly, and concealed wiring. Provide #12 gauge reinforced S.S. threshold and heater wire around the full perimeter (freezer door only). All doors hinged as shown, each with heated 14" x 24" "vision" panel.
- E. Standard Hardware: Shall be break-a-way type with cylinder lock and inside safety release handle so door can be opened from the inside even if locked. All latches designed for locking with keyed-alike locks. A positive action hydraulic door closer shall be included to insure gentle closing action of door and insure a positive seal. Hinges shall be cam-lift, self-closing, spring assist with door lift-off capability. Hinges shall be high-pressure zinc die cast with highly polished chrome finish, three per door.
- F. Filler Panels: The "exposed" open area of unit at left, right and top at front and sides neatly trimmed with #20 gauge stucco S.S. filler panels to close space between wall and ceiling. Filler panels between top of walk-in box and finished ceiling not to exceed 12" in height. Filler panels equal to exterior of unit. Top panels to be equipped with louvered sections not less than 40% of total square footage of panel (when compressor units are top-mounted).
- G. Wall Protection: Two rows of #16 gauge S.S. hat shaped rub rails with concealed fasteners; to be provided and installed at all exposed exterior walls. Top of rub rail to align with top of diamond tread kick plate on door and bottom rub rail to be 10" A.F.F. When corners are exposed, provide 6" x 6" x 60" #12 gauge S.S. corner guard.
- H. Lights: Walk-In boxes to be provided with 48" LED light fixtures, Kason model #1810, quantity as shown on plan. The walk-in cooler and freezer to have LED type vapor-proof light, Kason model #1806, with concealed wiring, etc., and toggle switch with pilot light mounted on exterior. Kitchen Equipment Contractor to provide bulbs. It is the responsibility of the Kitchen Equipment Contractor to install light fixtures, provide penetrations in ceiling panels,

and seal the penetrations after Electrical Contractor has completed wiring.

- I. Sealants: Kitchen Equipment Contractor shall seal all lines, conduits, tubing, wiring, etc., passing through walls and ceiling of walk-in units with high grade caulking compound, then install S.S. escutcheons where required.
- J. Alarm System: Each compartment shall be protected by Modularm 75LC system with recessed in panel controls. System provided with wireless communicator, mounted at walk-in units, for connection to building network. System shall provide digital readout of ambient compartment temperature(s). The system shall be located in an area as indicated on the contract documents. It shall require 120/60/1 electrical connection through suitable 1/2" conduit. CAT5 cable connection for activation of remote notification equipment will be provided as part of the alarm system. CAT5 cabling provided and installed by General Contractor. Furnish and install identification labels for operating temperatures as required.
- K. Ceiling Support: When split ceilings are required due to ceiling panel span, these ceilings are to be supported by a self-support ceiling structure. The walk-in manufacturer is to provide the ceiling hanger brackets, the steel channels and the bearing steel channels. A detail must be provided on the manufacturer's submittal drawing. Note: When longer spans are required that exceed self-support capability then suspended ceilings are to be provided with manufacturer's detail.
- L. Flat Membrane Weather-Proof Roof: Shall be supplied for field installation on top of each walk-in that is located outdoors. Membranes to be fabricated from low-shrink polyester fabric coated with a permanent thermoplastic alloy and have a minimum thickness of 35 mil. Membrane shall be fire retardant, resistant to ultra-violet rays and micro-organisms. Membrane to be white in color to reflect maximum heat load from the sun. Fasteners and trim shall be provided to secure the membrane to the ceiling panels and in cases where walk-in is installed against a building; the membrane roof material will be flashed up the building walls by the equipment installation contractor. The manufacturer's detail must be provided on the submittal drawing.
- M. Compressors and Evaporators: Cooler unit, model as indicated on drawings; room air drawn through coil and discharged parallel to ceiling. The coil casing is to be aluminum with a removable drain pan. Drain line from evaporator coil to floor drain as indicated on contract drawings, attached to interior of box with clamps and installed in good, approved, workmanlike manner by Plumbing Contractor. Compressor of the hermetic and/or scroll type, with suction gas cooled motor, designed for operation with approved refrigerant. Unit complete with liquid line drier, shut-off valves, vibration isolators, heat exchanger, dual pressure control and water regulating valve (for water-cooled systems), electrical panel with circuit breaker and magnetic starter. All components and accessories in control box that pertains to the compressor unit only should be factory wired and piped.

For outdoor systems a weather-proof housing, thermostatically controlled crank case heater and low ambient controls for -20F conditions shall be provided.

Note: Electrical Contractor to provide and install fused disconnect switch where required, as well as conduit and wiring from same to terminals in compressor unit control panel. Also, interconnect conduit and wiring from compressor unit control panel to unit cooler junction box inside walk-in units.

Freezer Unit, model as indicated on drawing, to be electric defrost. The coil casing is to be aluminum with a removable drain pan. Electric heating elements and drain pan heaters. Unit

shall include control kit for time initiated temperature terminated defrost plus automatic fan delay. Heat interchanger included. Drain line from evaporator coil to floor drain as indicated on contract drawings, attached to interior of box with clamps and painted to match interior finish; and installed in good, approved, workmanlike manner by Plumbing Contractor. Kitchen Equipment Contractor to install adequate amount of wrap-around, electric heater tape to assure defrosting of drain line, cable lapped not over 1" spacing. Provide Raychem Winter Guard Plus electrical heat tracing model H611050 (type 3), self regulating in temperature, run in parallel, to be designed with a maximum temperature that cannot be surpassed, certified by the manufacturer's representative that the heat trace has been installed and tested in accordance to the manufacturer's specifications. Heater tape connected to electric by Electrical Contractor. After installation and before and after installing the thermal insulation, subject heat to testing using a 2500 VDC megger. Minimum insulation resistance should be 20 megohms regardless of length. The installer shall test for both heating cable bus wires to verify the connection of any splices or tees.

Equipment shall have BTU/hr capacity as indicated on drawing and maintain room temperature of 35° to 36° Fahrenheit, where refrigerator is specified, and 0° to “minus” 10° Fahrenheit, where freezer is specified.

Refrigerant piping to be hard seamless copper tubing, by KEC. Refrigerant lines installed and covered with not less than 1" thick flexible foam plastic insulation applied in accordance with the manufacturer's recommendations. Refrigeration lines to run from compressor location where shown, above the walk-in units. All lines to be tested free from leaks prior to finish of insulated lines. Condensates drain lines outside of walk-in boxes, similarly insulated with 1/2" insulation, by KEC. Each system shall have suction line filters and vibration eliminators field installed.

Thermostatic expansion valves properly sized to handle evaporator loads. Liquid lines shall have moisture indicating sight glass, drier, and shut-off valve field installed.

The temperature in each walk-in box controlled by means of a thermostat wired to actuate a solenoid valve in the liquid lines with the compressor operation controlled by the low pressure cut-out switch. Thermostats and low pressure controls adjusted to maintain room temperatures specified. Each system cleaned and dehydrated by maintaining a vacuum of 500 microns or lower for a minimum period of 5 hours. The vacuum pump used capable of developing a vacuum of 50 microns with its valve in a closed position. The required operating charge of refrigerant and oil shall then be added and each system tested for performance. All refrigerant lines sized for 1 lb. maximum pressure drop.

It is the purpose of the specification to provide a satisfactory refrigeration cycle, therefore, Kitchen Equipment Contractor must include the competent labor and qualified material to provide the owner with an efficient system.

- N. Mounting Methods: Compressors, when mounted on building roof, to be provided with adequate dunnage/ curbing by Kitchen Equipment Contractor. Dunnage/ curbing installed by G.C. or roofing contractor. Architect to specify dunnage/ curbing details.

Compressors, when mounted on ceiling of walk-in, to be provided with adequate air circulation, service, access, and vibration isolation.

1.52 NOT APPLICABLE

PART 2 – PRODUCTS

ITEM #1 ~~WALK-IN COOLER – QTY. AS PER PLAN & SCHEDULE~~ **N.I.C.**

Norlake Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Walk-in Cooler Height: 8'-7" AFF
- Exterior Finish: Stucco stainless steel where exposed, 20 Gauge
- Pre-formed panels: 4" thick, polyurethane insulation
- 1-1/2" Vinyl screed application, appropriate floor finish by General Contractor
- Interior Floor Finish: Continuation of kitchen flooring material, as selected by Architect
- Interior / Exterior diamond tread kick plate at door section, foamed in place
- 1 ea. 36" x 78" door with vision panel
- 1 ea. Flush mount temperature alarm with wireless communicator system, Modularm 75LC
- 1 ea. Evaporator Coil Limit Switch, mounted in interior door frame
- 1 ea. Flat membrane roof cap, polyester fabric 35 mil. minimum thickness
- Stainless Steel Flashing:
 - Applied at penetration where exterior wall meets walk-in door
 - Applied where exterior wall meets walk-in box, full perimeter
 - Secured/sealed at top, bottom, left and right, as required

Or as manufactured by Kolpak or American Panel.

ITEM #2 ~~REFRIGERATION TO ITEM #1 – QTY. AS PER PLAN & SCHEDULE~~ **N.I.C.**

Norlake Model FFAP-015Z-TFC with WL6A117SDAS. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired, compressor unit
- Electrical: 120/1, Hardwired, evaporator coil
- Refrigeration: R-134A
- Refrigerant line maximum run distance, 100 feet
- 1 ea. Evaporator coils mounted within walk-in box, suspended from ceiling
- 1 ea. Compressor units mounted on walk-in box roof
- 1 ea. Dunnage rack, rails or curb for compressor unit
- 1 ea. Weatherproof cowl
- 1 ea. Winterized controls

Or as manufactured by Kolpak or American Panel.

ITEM #3 ~~STORAGE SHELVING, PORTABLE – QTY. AS PER PLAN & SCHEDULE~~ **N.I.C.**

Focus Model FMPS2148695. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Shelving to be sized to fit
- 5 ea. 21" x 48" Shelves with removable, vented inserts
- 4 ea. 64" High uprights
- Mounted on heavy-duty casters, front two with brakes

Or as manufactured by Eagle Group/Metal Masters or Metro.

ITEM #4

~~WALK-IN FREEZER - QTY. AS PER PLAN & SCHEDULE~~

N.I.C.

Norlake Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Walk-in Cooler Height: 8'-7" AFF
- Exterior Finish: Stucco stainless steel where exposed, 20 Gauge
- Pre-formed panels: 4" thick, polyurethane insulation
- Pre-formed floor panel: 4" thick, polyurethane insulation with integral 3/4" marine grade plywood
- Interior Floor Finish: Fully welded vinyl safety flooring
- Interior / Exterior diamond tread kick plate at door section, foamed in place
- 1 ea. Interior ramp
- 1 ea. 36" x 78" door with vision panel
- 1 ea. Flush mount temperature alarm with wireless communicator system, Modularm 75LC
- 1 ea. Evaporator Coil Limit Switch, mounted in interior door frame
- 1 ea. Flat membrane roof cap, polyester fabric 35 mil. minimum thickness

Or as manufactured by Kolpak or American Panel.

ITEM #5

~~REFRIGERATION TO ITEM #4 - QTY. AS PER PLAN & SCHEDULE~~

N.I.C.

Norlake Model FFAL-015Z-TFC with WL6E066DDAS. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired, compressor unit
- Electrical: 208/1, Hardwired, evaporator coil
- Refrigeration: R-449A
- Refrigerant line maximum run distance, 100 feet
- 1 ea. Evaporator coils mounted within walk-in box, suspended from ceiling
- 1 ea. Compressor units mounted on walk-in box roof
- 1 ea. Dunnage rack, rails or curb for compressor unit
- 1 ea. Weatherproof cowl
- 1 ea. Winterized controls

Or as manufactured by Kolpak or American Panel.

ITEM #6 ~~STORAGE SHELVING, PORTABLE QTY. AS PER PLAN & SCHEDULE~~ **N.I.C.**

Focus Model FMPS2148695. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Shelving to be sized to fit
- 5 ea. 21" x 48" Shelves with removable, vented inserts
- 4 ea. 64" High uprights
- Mounted on heavy-duty casters, front two with brakes

Or as manufactured by Eagle Group/Metal Masters or Metro.

ITEM #7 ~~S.S. THRESHOLD / FLASHING QTY. AS PER PLAN & SCHEDULE~~ **N.I.C.**

Norlake Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Applied at interior penetration where wall meets walk-in box panels
- Applied at exterior where wall meets wall meets walk-in box panels
- Secured/sealed at top, bottom, left and right, as required
- Stainless steel doorway opening interior sides/top
- Stainless steel doorway opening casing, 2" wide continuous flange

Or as manufactured by Kolpak or American Panel.

ITEM #8 S.S. WALL PANEL(S) – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Stainless steel panels, evenly sized, 20 Gauge
- Installed from top of coved base to underside of hood, entire length
- Hairline joints sealed with S.S. trim strips
- Secured to wall with heat resistant mastic

It is the responsibility of the Kitchen Equipment Contractor to coordinate and make all appropriate cut-outs in paneling based on utility requirements in this location and apply appropriate stainless steel trim strips, caps, gussets, etc...

Or as manufactured by Eagle Group/Metal Masters or IMC/ Teddy.

ITEM #9 ~~FRYER BATTERY, DEEP FAT, GAS QTY. AS PER PLAN & SCHEDULE~~ **N.I.C.**

Pitco Model 2-SG14C-S/FD. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: (3)120/1, NEMA 5-15P

- Gas: 1" Rear Connection, 244 MBtuh
- 1 ea. Manifold gas line for double unit
- 1 ea. Pressure regulator
- 2 ea. Piezo ignitor
- 2 ea. Fryer, full pot
- 4 ea. Half size baskets
- 2 ea. Full size baskets
- 2 ea. Stainless steel frypot covers
- 2 ea. Standard controls
- 1 ea. Built-in filtration
- 1 ea. 48" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Frymaster or Ultrafryer.

ITEM #10 FLOOR TROUGH – QTY. AS PER PLAN & SCHEDULE - **ALTERNATE NO. 4 (ADD)**

Eagle Group/Metal Masters Model ASFT-2436-SG. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. NSF Approved
- 1 ea. Anti-splash style
- 1 ea. Fibergrate style Micromesh, removable grate, ADA type, gridded fiberglass

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #11 ~~KETTLE, STEAM JACKETED – QTY. AS PER PLAN & SCHEDULE~~ **N.I.C.**

Cleveland Range Model KGL-40-T. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Gas: 3/4" Rear Connection, 140 MBtuh
- 1 ea. Pressure regulator
- 1 ea. Electronic spark ignition
- 1 ea. Tilting kettle accessory kit
- 1 ea. Tangent draw-off assembly, TD2A45
- 1 ea. Power lift
- 1 ea. Double pantry faucet, DPKT
- 1 ea. Kettle markings, 5 gallon increments
- 1 ea. 316 Stainless steel liner
- 1 ea. Lift off cover, CL40
- 1 ea. Descaling solution

Or as manufactured by Groen or Southbend.

ITEM #12 RANGE, RESTAURANT, GAS – QTY. AS PER PLAN & SCHEDULE - **ALTERNATE NO. 3 (ADD)**

Southbend Model 4601DD. Unit to be installed where shown on drawings. Provided

with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Gas: 3/4" Rear Connection, 420 MBtuh
- 1 ea. 10-Burner section
- 2 ea. Standard oven base
- 1 ea. Electronic/ battery spark ignition
- 1 ea. 24" Stainless steel stub back with tubular overshef
- 1 ea. 48" Quick disconnect with flexible hose
- 2 ea. Restraint cable
- 1 ea. Stainless steel back
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Garland or Vulcan.

ITEM #13 ~~WORK TABLE, PORTABLE QTY. AS PER PLAN & SCHEDULE~~ N.I.C.

Eagle Group/Metal Masters Model T2430SE. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Stainless steel undershef, removable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #14 SPARE NUMBER

ITEM #15 FILLER, POT – QTY. AS PER PLAN & SCHEDULE

Fisher Model 54836. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Wall mount faucet, 1/2" connection
- 1 ea. Wall mount bracket
- All necessary components for proper install and operation

Or as manufactured by CHG or T&S Brass.

ITEM #16 RANGE, RESTAURANT, GAS – QTY. AS PER PLAN & SCHEDULE

Southbend Model 4601DD. Southbend Model 4601DD. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Walk-in Cooler Height: 8'-7" AFF
- Exterior Finish: Stucco stainless steel where exposed, 20 Gauge
- Pre-formed panels: 4" thick, polyurethane insulation
- 1-1/2" Vinyl screed application, appropriate floor finish by General Contractor

- Interior Floor Finish: Continuation of kitchen flooring material, as selected by Architect
- Interior / Exterior diamond tread kick plate at door section, foamed in place
- 1 ea. 36" x 78" door with vision panel
- 1 ea. Flush mount temperature alarm with wireless communicator system, Modularm 75LC
- 1 ea. Evaporator Coil Limit Switch, mounted in interior door frame
- 1 ea. Flat membrane roof cap, polyester fabric 35 mil. minimum thickness
- S.S. Flashing:
 - Applied at penetration where exterior wall meets walk-in door
 - Secured/sealed at top, bottom, left and right, as required

ITEM #17 OVEN, CONVECTION, ELECTRIC – QTY. AS PER PLAN & SCHEDULE

Vulcan Model VC4ED. Existing to be reused. Unit to be installed where shown on drawings. This is an existing item and is to be handled as described in General Specifications. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired with cord/plug, verify
- All utility requirements to be verified by K.E.C.

ITEM #18 RACK, UNIVERSAL – QTY. AS PER PLAN & SCHEDULE

Channel Mfg. Model AUR-12. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- No additional features, options or accessories required

Or as manufactured by Lockwood or New Age Industrial.

ITEM #19 EXHAUST HOOD, TYPE I – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Construction: 100% 304 stainless steel
- Filters: Stainless steel captrate solo with hook
- Insulation: Integral air / insulation barriers at perimeter and top, 0" clearance to combustibles
- Structural front panel, insulated
- Wall / Island canopy hood, length / size as per contract documents
- 3 ea. Front perforated supply plenum (PSP) with built-in 3" back standoff
- Insulation for PSP housing, as required
- 9 ea. 48" Lights with bulbs
- Stainless steel field wrap, approximately 18" high on all exposed sides
- Adjustable exhaust air volume control damper
- Hood Control Panel Package:
 - EMSplus11 modulating energy management system with smart controls
 - VFDs

- Duct Temperature Sensors in all risers
- Room Temperature Sensor
- Configurable through Touch Screen Interface
- EMS Duct Thermostat
- INVERTER DUTY THREE PHASE MOTORS REQUIRED

No alternate manufacturers will be accepted for this item.

ITEM #20 SUPPLY PLENUM, MAKE-UP AIR – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #19 Exhaust Hood

No alternate manufacturers will be accepted for this item.

ITEM #21 SPARE NUMBER

ITEM #22 EXHAUST HOOD, CONTROL INTERFACE – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #19, Exhaust Hood

No alternate manufacturers will be accepted for this item.

ITEM #23 FIRE PROTECTION SYSTEM, TOTAL FLOOD – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model UL-300 (R-102). Unit to be installed where shown on drawing in strict accordance to that described in General Specifications. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Provide connection to building Fire Alarm System
- 1 ea. Mechanical Gas valve, up to 3", size to be verified
 - Provide add/ alternate for electric gas valve
- 1 ea. Reset Relay Push Button
 - Only required with use of electric gas valve
- For the protection of equipment beneath Exhaust Hood, Item #19

No alternate manufacturers will be accepted for this item.

ITEM #24 EXHAUST HOOD, CONTROL PANEL – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Item #19, Exhaust Hood

No alternate manufacturers will be accepted for this item.

ITEM #25 SPARE NUMBER

ITEM #26 SINK, HAND WITH SOAP DISPENSER – QTY. AS PER PLAN & SCHEDULE - **ALTERNATE NO. 2 (ADD)**

Eagle Group/Metal Masters Model HSA-10-FDPS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- **Alternate No. 2 (Add)**
- 1 ea. Soap dispenser
- 1 ea. Towel dispenser
- 1 ea. Gooseneck faucet model 303987 with wrist action handles, 1/2" connections
- 1 ea. Emergency Eye Wash Unit, 326272
- Wall backing by General Contractor

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #27 ~~WORK TABLE, PORTABLE – QTY. AS PER PLAN & SCHEDULE~~ **N.I.C.**

Eagle Group/Metal Masters Model T3072SE-HA. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Adjustable height assembly
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #28 SPARE NUMBER

ITEM #29 ~~WORK DRAWER(S), BUILT-IN – QTY. AS PER PLAN & SCHEDULE~~ **N.I.C.**

Eagle Group/Metal Masters Model 502971. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Included as part of Items #27, #30, #31, #32, #33, #34, #36, #37, #38 and #39
- Stainless steel integrated handles, horizontal orientation
- 1 ea. Self-closing drawer
- 1 ea. Drawer safety stop
- 1 ea. Stainless steel pan insert, full size removable

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #30 ~~ADA WORK TABLE, PORTABLE QTY. AS PER PLAN & SCHEDULE~~ **N.I.C.**

Eagle Group/Metal Masters Model T3072SE-ADA. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- ADA Compliant
- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel tubular crossrails, side / rear

- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #31 ~~WORK TABLE, PORTABLE QTY. AS PER PLAN & SCHEDULE~~ **N.I.C.**

Eagle Group/Metal Masters Model T3072SE. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #32 ~~WORK TABLE, PORTABLE QTY. AS PER PLAN & SCHEDULE~~ **N.I.C.**

Eagle Group/Metal Masters Model T3072SE. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #33 ~~WORK TABLE, PORTABLE QTY. AS PER PLAN & SCHEDULE~~ **N.I.C.**

Eagle Group/Metal Masters Model T3072SE. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge

- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #34 ~~WORK TABLE, PORTABLE QTY. AS PER PLAN & SCHEDULE~~ **N.I.C.**

Eagle Group/Metal Masters Model T3072SE. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #35 SPARE NUMBER

ITEM #36 ~~WORK TABLE, PORTABLE QTY. AS PER PLAN & SCHEDULE~~ **N.I.C.**

Eagle Group/Metal Masters Model T3072SE. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #37 ~~WORK TABLE, PORTABLE QTY. AS PER PLAN & SCHEDULE~~ **N.I.C.**

Eagle Group/Metal Masters Model T3072SE. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #38 ~~WORK TABLE, PORTABLE QTY. AS PER PLAN & SCHEDULE~~ **N.I.C.**

Eagle Group/Metal Masters Model T3072SE. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #39 ~~WORK TABLE, PORTABLE QTY. AS PER PLAN & SCHEDULE~~ **N.I.C.**

Eagle Group/Metal Masters Model T3072SE. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #40 ADA HAND SINK, WALL MOUNT – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model HSAP-14-ADA-FW. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- ADA Compliant
- 1 ea. C-fold towel dispenser in front skirt
- 1 ea. Deck mounted soap dispenser
- 1 ea. Gooseneck faucet model 303987 with wrist action handles, 1/2" connections
- 1 ea. Emergency Eye Wash Unit, 326272
- Wall backing by General Contractor

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #41 2-COMPARTMENT, PREP. TABLE – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model FN2032-2-36-14/3. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 2 ea. Built-in work sinks, 20" L x 16" W x 12" D
- 2 ea. Waste valve with lever, Fisher Mfg. model DrainKing
- 2 ea. Tail piece, Fisher Mfg. model 6129
- 2 ea. Waste overflow, Fisher Mfg.
- 1 ea. Stainless steel Faucet, Fisher Mfg. model 60798 with 12" swing spout and wrist action handles, 1/2" connections
- 1 ea. Stainless steel common bowl skirt
- Stainless steel undershelf, removable

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #42 SPARE NUMBER

ITEM #43 CABINET, MOBILE, WARMING & HOLDING – QTY. AS PER PLAN & SCHEDULE

Alto-Shaam Model 1000-UP. Existing to be reused. Unit to be installed where shown on drawings. This is an existing item and is to be handled as described in General Specifications. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-20P
- All utility requirements to be verified by K.E.C.

ITEM #44 REFRIGERATOR, REACH-IN – QTY. AS PER PLAN & SCHEDULE

Traulsen Model RHT232DUT-FHS. Existing to be reused. Unit to be installed where shown on drawings. This is an existing item and is to be handled as described in General Specifications. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- All utility requirements to be verified by K.E.C.

ITEM #45 FREEZER, REACH-IN – QTY. AS PER PLAN & SCHEDULE

Traulsen Model RLT232WUT-FHS. Existing to be reused. Unit to be installed where shown on drawings. This is an existing item and is to be handled as described in General Specifications. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-20P
- All utility requirements to be verified by K.E.C.

ITEM #46 ~~ICE MAKER W/ BIN – QTY. AS PER PLAN & SCHEDULE~~

N.I.C.

Manitowoc Ice Model ID-0606A-261 / B-570. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, hardwired
- 1 ea. Automatic Cleaning System, AuCS

- 1 ea. Stainless steel ice scoop
- Cold water connection piped from Central Filter System, Item #55

Or as manufactured by Hoshizaki or Scotsman.

ITEM #47 DEMO TABLE, OVERHEAD MIRROR – QTY. AS PER PLAN & SCHEDULE - **ALTERNATE NO. 1 (ADD)**

Eagle Group/Metal Masters Model DT3672SE. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15R
- 1 ea. GFCI duplex receptacles mounted in apron
- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Tilting frame
- 1 ea. Locking knobs
- 1 ea. Stainless steel undershelf, adjustable
- Flanged feet bolted to floor

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #48 SINK, WELDED-IN – QTY. AS PER PLAN & SCHEDULE - **ALTERNATE NO. 1 (ADD)**

Eagle Group/Metal Masters Model SR14-16-9.5-1. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Built-in work sink, 16" L x 14" W x 9.5" D each
- 1 ea. DrainKing waste valve
- 1 ea. Stainless Steel faucet, Fisher Mfg. model 57665 with 12" swing spout and wrist action handles, 1/2" connections
- Welded into Item #47, Demo Table

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #49 SPARE NUMBER

ITEM #50 SINK, HAND WITH SOAP DISPENSER – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model HSA-10-FDPS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Soap dispenser
- 1 ea. Towel dispenser
- 1 ea. Gooseneck faucet model 303987 with wrist action handles, 1/2" connections
- 1 ea. Emergency Eye Wash Unit, 326272
- Wall backing by General Contractor

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #51 S.S. WALL PANEL(S) – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Stainless steel panels, evenly sized, 20 Gauge
- Installed from top of coved base to underside of hood, entire length
- Hairline joints sealed with S.S. trim strips
- Secured to wall with heat resistant mastic

It is the responsibility of the Kitchen Equipment Contractor to coordinate and make all appropriate cut-outs in paneling based on utility requirements in this location and apply appropriate stainless steel trim strips, caps, gussets, etc...

Or as manufactured by Eagle Group/Metal Masters or IMC/ Teddy.

ITEM #52 3-COMPARTMENT SINK – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model FFN2772-3-30-14/3. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 3 ea. Built-in work sinks, 27" L x 24" W x 14" D
- 3 ea. Waste valve with lever, Fisher Mfg. model DrainKing
- 3 ea. Tail piece, Fisher Mfg. model 6129
- 3 ea. Waste overflow, Fisher Mfg.
- 1 ea. Stainless steel Faucet, Fisher Mfg. model 24589 with 14" swing spout add-on faucet, 3/4" connections
- 1 ea. Stainless steel Faucet, Fisher Mfg. model 51209 with 14" swing spout, 3/4" connections
- Stainless steel common bowl skirt

Or as manufactured by Aero Mfg. or IMC/ Teddy.

ITEM #53 STORAGE SYSTEM, WALL MNTD. – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model WAL-STOR. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting Height: 50" above finished floor
- 2 ea. Wall grid/mat, WM1860-E
- 1 ea. Wall uprights, vertical, PR45VU-E
- 3 ea. Shelf, 1448-E
- 3 ea. Shelf Brackets, PR14B-E
- 2 ea. Grid Shelf, 1436WGS-E
- 3 ea. Baskets, WB-E

- 12 ea. Utility Hooks, UH-E
- 1 ea. Epoxy coated finish, entire wall system
- Wall backing by General Contractor

Or as manufactured by Focus or Metro.

ITEM #K54 SINK, UTILITY / ANTI-SPLASH – QTY. AS PER PLAN & SCHEDULE

IMC/ Teddy Model FS-AS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. 4-Pole mop holder
- 1 ea. Hose and bracket
- 1 ea. Service faucet
- 1 ea. Anti-splash basin

Or as manufactured by Aero Mfg. or Eagle Group/Metal Masters.

ITEM #K55 CENTRAL FILTER SYSTEM – QTY. AS PER PLAN & SCHEDULE

A.J. Antunes/Roundup Model VZN441V-T5. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. Vertical 15 gallon, ultra filtration with carbon element
- 1 ea. TAC-5 cartridge for lime scale reduction, self-cleaning
- 1 ea. Strainer kit, 7000519

Or as manufactured by Everpure or Pentair.

ITEM #K56 SPARE NUMBER

PART 3 - EXECUTION

3.1 GENERAL RELATED CODITIONS

- A. In each item of equipment hereinafter specified under the "Equipment Schedule," these specifications shall only identify each respective item by name and number, as well as list various component parts provided for same.
- B. Therefore, it shall be intended that these respective items and their component parts shall be of material (mounted where applicable) constructed and furnished in strict accordance to that described in the general specifications for these items and integrally constructed where applicable.
- C. It shall also be intended that where buy-out (pre-fabricated) items are specified, same shall be definitely furnished with all the accessories as normally furnished by manufacturer for these items. Also in strict accordance with current manufacturer's engineering data sheet for each respective item.

3.2 SPECIAL NOTES

- A. It shall be the responsibility of Kitchen Equipment Contractor to keep up to date with progress made in field on installation of all necessary roughing to adequately and properly operate and accommodate all equipment furnished by Kitchen Equipment Contractor and as shown on drawings, to make as many visits to the job site as is necessary to check and assure that all roughing is being properly installed to accommodate this equipment. Include this service in bid.
- B. Kitchen Equipment Contractor to cooperate with all trades so that the end results of his work will be a satisfactory, approved and accepted installation. Written reports of each visit shall be sent promptly to the Architect and the Food Service Consultant.

3.3 COORDINATION

- A. Procedure of construction is of paramount importance in executions of this project. Kitchen Equipment Contractor to carry on his work so that no delay in his operations or those of any other contractors occurs at any time.
- B. Kitchen Equipment Contractor to verify with Architect as to opening date of the food service area, and schedule his fabrication and purchasing of equipment so that all will be in readiness, installed, connected, tested, demonstrated, etc., in ample time prior to the scheduled opening date.

3.4 DELIVERY AND INSTALLATION

- A. Shall mean and intend that Kitchen Equipment Contractor shall deliver and assemble all equipment of contract in 1 piece in required locations in building, ready for water, waste, gas, electric and ventilating connections required by other contractors. Any pieces of equipment may be delivered sectionally, but all working surfaces butt-welded, ground and polished on premises so that upon completion, such item of equipment will have true, smooth, even and continuous surfaces. Butt joining and filling with solder not permitted. Kitchen Equipment Contractor must verify door sizes, delivery platform, elevator size, etc., effecting delivery to food service areas for all items of equipment.

3.5 RESERVATIONS AND CONDITIONS

- A. It is the intent of this specification to complete the installation of all equipment covered herein in all phases ready for operation. Contractor shall carefully examine the plans and specifications for building construction contracts and determine therefrom the extent of his operations in all respects. All labor and materials not included in building construction contracts necessary to accomplish this intent are hereby included in this contract.
- B. Kitchen Equipment Contractor shall attend job meetings when required for purpose of coordinating his work with other trades.
- C. All equipment shall be received at the building fully protected. It will be the responsibility of the Kitchen Equipment Contractor to protect the equipment until completely installed and accepted.

3.6 EXISTING EQUIPMENT (RELOCATED AND/OR REINSTALLED)

- A. Prior to submission of bid for equipment listed in Schedule of Equipment, Kitchen Equipment Contractor shall visit the existing facilities and associated areas to survey all existing equipment

intended to be reused (or not used) to determine the extent of his/her work.

- B. Kitchen Equipment Contractor responsible for verifying all reusable equipment's sizing, utility and mechanical requirements, prior to release of any custom fabrication or equipment associated with it. Additionally, all makes, models, etc...of said equipment to be verified by the Kitchen Equipment Contractor.
- C. Bid shall include the cost of dismantling and moving, all reusable equipment to a temporary storage location designated by the Owner. In the event that the Owner cannot provide temporary storage, the Kitchen Equipment Contractor shall move all reusable existing equipment to his/her storage facility. When the facility is ready to receive equipment, the Kitchen Equipment Contractor shall deliver and set in place all new equipment, as well as all reusable existing equipment.
- D. Kitchen Equipment Contractor shall submit separate price for the removal from the premises all old, not reused kitchen equipment as identified by Owner and/or contract documents. Disposal of all such equipment shall be at the discretion of Kitchen Equipment Contractor, but shall be removed from the premises immediately when available. If price is not acceptable, the equipment shall remain the property of Owner.
- E. When new areas are completed, Kitchen Equipment Contractor shall locate all new and reusable existing equipment in their respective locations, assemble and set in place, as shown on drawings, left ready for necessary final connections by respective trades. Conditions listed in the specifications under "Delivery and Installation" shall apply to all reusable existing equipment.
- F. Rough-in drawings and all other necessary drawings and information covering the proper installation of all reusable existing equipment shall be submitted by Kitchen Equipment Contractor.
- G. All necessary plumbing, electrical, mechanical, etc...disconnections associated with reusable equipment shall be completed by the respective trades.

END OF SECTION 11 40 00

SECTION 323113 - CHAIN LINK FENCES AND GATES

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. Chain-link fences, posts, top and bottom rails and mesh.
 - 2. Gates: (2) hinged, 3'-6" gates.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Chain-link fence and gate framework shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions according to ASCE/SEI 7:
 - 1. Post Size: 2" diameter, 6'-0" high,
 - 2. Gate posts: 2-1/2" diameter (Minimum).

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chain-link fences and gates.
 - 1. Fence and gate posts, rails, and fittings. fused, bonded vinyl coating; color to be selected
 - 2. Chain-link fabric: 1-5/8" x 1-5/8" by 11 gauge.
 - 3. Accessories: Privacy slats
 - 4. Gates and lockable hardware.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Show accessories, hardware, gate operation, and operational clearances.
- C. Samples for Initial Selection: For components with factory-applied color finishes.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified factory-authorized service representative.

- B. Product Certificates: For each type of chain-link fence and gate, from manufacturer.
- C. Product Test Reports: For framing strength according to ASTM F 1043.
- D. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For the following to include in emergency, operation, and maintenance manuals:
 - 1. Polymer finishes.
 - 2. Lockable Gate hardware.

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing fence grounding. Member Company of NETA or an NRTL.
 - 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CHAIN-LINK FENCE FABRIC

- A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with CLFMI Product Manual and with requirements indicated below:
1. Fabric Height: 6'-0"
 2. Steel Wire Fabric: Wire with a diameter of 0.192 inch
 - a. Mesh Size: 1-5/8" inches
 - b. Polymer-Coated Fabric: ASTM F 668, coated 11 gauge steel wire, color to be determined.
 - c. Coat selvage ends of fabric that is metallic coated before the weaving process with manufacturer's standard clear protective coating.

2.2 FENCE FRAMING

- A. Posts and Rails: Comply with ASTM F 1043 for framing, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F 1043 or ASTM F 1083 based on the following:
1. Fence Height: 72 inches
 2. Industrial Strength: Material
 - a. Line Post: 2 inches in diameter minimum
 - b. End, Corner and Pull Post: 4.0 inches
 3. Horizontal Framework Members: Intermediate, top and bottom rails complying with ASTM F 1043.
 - a. Top Rail and bottom rail: 1.66 inches in diameter
 4. Metallic Coating for Steel Framing:
 - a. Type A, consisting of not less than minimum 2.0-oz./sq. ft. (0.61-kg/sq. m) average zinc coating per ASTM A 123/A 123M or 4.0-oz./sq. ft. (1.22-kg/sq. m) zinc coating per ASTM A 653/A 653M.
 - b. Type B, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. (0.27 kg/sq. m) of zinc after welding, a chromate conversion coating, and a clear, verifiable polymer film.
 - c. External, Type B, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. (0.27 kg/sq. m) of zinc after welding, a chromate conversion coating, and a clear, verifiable polymer film. Internal, Type D, consisting of 81 percent, not less than 0.3-mil- (0.0076-mm-) thick, zinc-pigmented coating.
 - d. Type C, Zn-5-Al-MM alloy, consisting of not less than 1.8-oz./sq. ft. coating.
 - e. Coatings: Any coating above suitable for fused bonded vinyl black coating.

2.3 SWING GATES

- A. General: Comply with ASTM F 900 for gate posts and single swing gate types.
 - 1. Gate Leaf Width: 42 inches
 - 2. Gate Fabric Height: 72 inches
- B. Pipe and Tubing:
 - 1. Zinc-Coated Steel: Comply with ASTM F 1043 and ASTM F 1083; protective coating and finish to match fence framing
 - 2. Gate Posts: Round tubular steel
 - 3. Gate Frames and Bracing: Round tubular steel
- C. Frame Corner Construction: Welded or assembled with corner fittings.
- D. Hardware: with black vinyl coating
 - 1. Hinges: 180-degree outward swing.
 - 2. Latches permitting operation from both sides of gate with provision for padlocking accessible from both sides of gate.
 - 3. Padlock and Chain: owner furnished

2.4 PRIVACY SLATS

- A. Fiber-Glass-Reinforced Plastic Slats: UV-light-stabilized fiber-glass-reinforced plastic, not less than 0.06 inch thick, sized to fit mesh specified for direction indicated, with vandal-resistant fasteners and lock strips.

2.5 FITTINGS

- A. General: Comply with ASTM F 626.
- B. Tension Bars: **Steel** length not less than 2 inches shorter than full height of chain-link fabric. Provide one bar for each gate and end post, and two for each corner and pull post, unless fabric is integrally woven into post.
- C. Tie Wires, Clips, and Fasteners: According to ASTM F 626.
 - 1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, complying with the following:
 - a. Hot-Dip Galvanized Steel with black vinyl finish coating: galvanized coating thickness matching coating thickness of chain-link fence fabric.
- D. Finish:
 - 1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz. /sq. ft. zinc.
 - a. Polymer coating over metallic coating.

2.6 GROUT AND ANCHORING CEMENT

- A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.
- B. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer, for exterior applications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.
 - 1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 INSTALLATION, GENERAL

- A. Install chain-link fencing to comply with ASTM F 567 and more stringent requirements indicated.

3.4 CHAIN-LINK FENCE INSTALLATION

- A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.
- B. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
 - 1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
 - 2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

- a. Exposed Concrete: Extend 2 inches above grade; shape and smooth to shed water.
 - b. Posts Set into Concrete in Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, and finished sloped to drain water away from post.
- C. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more
 - D. Line Posts: Space line posts uniformly at 96 inches
 - E. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.
 - F. Intermediate and Bottom Rails: Install and secure to posts with fittings.
 - G. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 2 inch finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.
 - H. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches o.c.
 - I. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.
 - 1. Maximum Spacing: Tie fabric to line posts at 12 inches o.c. and to braces at 24 inches o.c.
 - J. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.
 - K. Privacy Slats: Install slats in direction indicated, securely locked in place.
 - 1. Vertically

3.5 GATE INSTALLATION

- A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.6 ADJUSTING

- A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Lubricate hardware and other moving parts.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's personnel to adjust, operate, and maintain chain-link fences and gates.

END OF SECTION 323113