SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: **concrete mix designs and submittals required by ACI 301.**

B. Ready-Mixed Concrete Producer Qualifications: ASTM C 94/C 94M.

C. Comply with ACI 301, "Specification for Structural Concrete"; ACI 117, "Specifications for Tolerances for Concrete Construction and Materials"; and CRSI's "Manual of Standard Practice."

PART 2 - PRODUCTS

2.1 MATERIALS

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

B. Plain Steel Wire: ASTM A 82, as drawn.

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

D. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

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

F. Fly Ash: ASTM C 618, Type C or F.

G. Aggregates: ASTM C 33, uniformly graded.

H. Synthetic Fiber: ASTM C 1116, Type III, polypropylene fibers, 1/2 to 1-1/2 inches long.

I. Air-Entraining Admixture: ASTM C 260.

J. Chemical Admixtures: ASTM C 494, **water reducing**. Do not use calcium chloride or admixtures containing calcium chloride.

K. Vapor Retarder: **Clear 10-mil-thick polyethylene sheet.**

L. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

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

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

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

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

2.2 MIXES

A. Comply with ACI 301 requirements for concrete mixtures.

B. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:

1. Minimum Compressive Strength: **4000 psi** at 28 days.
2. Maximum Water-Cementitious Materials Ratio: **0.50**.
3. Slump Limit: **4 inches** , plus or minus 1 inch.
4. Air Content: Maintain within range permitted by ACI 301. Do not allow air content of floor slabs to receive troweled finishes to exceed 3 percent.

C. Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M.

1. When air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 CONCRETING

A. Construct formwork according to ACI 301 and maintain tolerances and surface irregularities within ACI 347R limits of Class A, 1/8 inch for concrete exposed to view and Class C, 1/2 inch for other concrete surfaces.

B. Place vapor retarder on prepared subgrade, with joints lapped 6 inches and sealed.

C. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

D. Install construction, isolation, and contraction joints where indicated. Install full-depth joint-filler strips at isolation joints.

E. Place concrete in a continuous operation and consolidate using mechanical vibrating equipment.

F. Protect concrete from physical damage, premature drying, and reduced strength due to hot or cold weather during mixing, placing, and curing.

G. Formed Surface Finish: Smooth-formed finish for concrete exposed to view, coated, or covered by waterproofing or other direct-applied material; rough-formed finish elsewhere.

H. Slab Finishes: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces. Provide the following finishes:

1. Scratch finish for surfaces to receive mortar setting beds.
2. Float finish for interior steps and ramps and surfaces to receive waterproofing, roofing, or other direct-applied material.
3. Troweled finish for floor surfaces and floors to receive floor coverings, paint, or other thin film-finish coatings.
4. Trowel and fine-broom finish for surfaces to receive thin-set tile.
5. Nonslip-broom finish to exterior concrete platforms, steps, and ramps.

I. Cure formed surfaces by moist curing for at least seven days.

J. Begin curing concrete slabs after finishing. **Keep concrete continuously moist for at least seven days.**

K. Owner will engage a testing agency to perform field tests and to submit test reports.

L. Protect concrete from damage. Repair surface defects in formed concrete and slabs.

END OF SECTION 033000

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. See Division 05 Section "Metal Fabrications" for furnishing steel **lintels** for unit masonry.

B. See Division 09 Section "Painting" for masonry primers and finish coatings.

C. Comply with ACI 530.1/ASCE 6/TMS 602.

D. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing required by authorities having jurisdiction.

E. Sample Panels: Construct a sample wall panel approximately 48 inches long by 48 inches high to demonstrate aesthetic effects and set quality standards for materials and execution.

PART 2 - PRODUCTS

2.1 MASONRY UNITS

A. Concrete Masonry Units: **ASTM C 90**; Weight Classification, **Normal Weight**.

1. Integral Water Repellent: **Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Dry-Block**.
2. Special shapes for lintels, corners, jambs, sash, control joints, and other special conditions.
3. **Single Bullnose** units for outside corners, unless otherwise indicated.

B. Concrete Lintels: Precast units matching concrete masonry units and with reinforcing bars indicated or required to support loads indicated.

2.2 MORTAR AND GROUT

A. Mortar: **ASTM C 270**, proportion specification.

1. Masonry Cement: **As recommended by Masonry Manufacturer.**
2. Do not use calcium chloride in mortar.
3. For masonry below grade or in contact with earth, use Type **M**.
4. For reinforced masonry, use Type **S**.
5. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions, and for other applications where another type is not indicated, use Type N.

6. Water-Repellent Additive: For mortar used with concrete masonry units made with integral water repellent, use product recommended by manufacturer of units.

B. Grout: **ASTM C 476** with a slump of 8 to 11 inches.

2.3 REINFORCEMENT, TIES, AND ANCHORS

A. Steel Reinforcing Bars: ASTM A 615/A 615M, Grade 60.

B. Joint Reinforcement: **ASTM A 951.**

1. Coating: **Hot-dip galvanized at both interior and exterior walls.**
2. Wire Diameter for Side Rods: **W1.7.**
3. Wire Diameter for Cross Rods: **W1.7.**
4. For single-wythe masonry, provide either ladder design or truss design.
5. For multiwythe masonry, provide **ladder design with three adjustable (two-piece) design with single pair of** side rods.

2.4 EMBEDDED FLASHING MATERIALS

A. Rubberized Asphalt Sheet Flashing: Pliable and highly adhesive rubberized asphalt compound, 26 mils thick, bonded to a polyethylene film, 4 mils thick, to produce an overall thickness of 30 mils.

2.5 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded strips complying with ASTM D 1056, Grade 2A1.

B. Preformed Control-Joint Gaskets: Designed to fit standard sash block and to maintain lateral stability in masonry wall; made from styrene-butadiene rubber or PVC.

C. Weep Holes: **Cellular-plastic extrusion, full height and width of head joint.**

D. Loose-Granular Perlite Insulation: ASTM C 549, Type II or IV.

E. Molded-Polystyrene Insulation Units: ASTM C 578, Type I; specially shaped units designed for installing in cores of masonry units.

F. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV or X.

G. Polyisocyanurate Board Insulation: ASTM C 1289, Type I, Class 2; aluminum-foil faced.

H. Proprietary Acidic Masonry Cleaner: Product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cut masonry units with saw. Install with cut surfaces and, where possible, cut edges concealed.

B. Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures.

C. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

D. Stopping and Resuming Work: Rack back units; do not tooth.

E. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

F. Build non-load-bearing interior partitions full height and install compressible filler in joint between top of partition and underside of structure above.

G. Tool exposed joints slightly concave when thumbprint hard, unless otherwise indicated.

H. Keep cavities clean of mortar droppings and other materials during construction.

3.2 LINTELS

A. Install lintels where indicated.

B. Minimum bearing of 8 inches at each jamb, unless otherwise indicated.

3.3 FLASHING AND WEEP HOLES

A. Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated.

B. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing before covering with mortar.

1. Extend flashing 4 inches into masonry at each end and turn up 2 inches to form a pan.

C. Trim wicking material used in weep holes flush with outside face of wall after mortar has set.

3.4 PARGING

A. Parge masonry walls, where indicated, in two uniform coats with a steel-trowel finish. Form a wash at top of parging and a cove at bottom. Damp cure parging for at least 24 hours.

3.5 CLEANING

A. Clean masonry as work progresses. Remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly cured, clean exposed masonry.

1. Wet wall surfaces with water before applying acidic cleaner, then remove cleaner promptly by rinsing thoroughly with clear water.
2. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION 042000

SECTION 055200 - METAL RAILINGS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Structural Performance: Provide railings capable of withstanding structural loads required by ASCE 7 & minimum windspeed of 150 mph sustained straight-line winds.

B. Submittals: Product Data, Shop Drawings, structural analysis data signed and sealed by a qualified professional engineer registered in the state where Project is located, indicating the failure point uniform loading in pounds & productive windspeed.

PART 2 - PRODUCTS

2.1 METALS

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

B. Steel Pipe: ASTM A 53, Schedule 40.

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

D. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

2.2 OTHER MATERIALS

A. Nonshrink, Nonmetallic Grout: SikaGrout 212.

2.3 FABRICATION

A. Assemble railing systems in shop to the greatest extent possible. Use connections that maintain structural value of joined pieces.

B. Form changes in direction of railing members by use of prefabricated fittings.

C. Fabricate railing systems and handrails for connecting members with concealed mechanical fasteners and fittings.

D. Provide manufacturer's standard wall brackets, flanges, miscellaneous fittings, and anchors to connect handrail and railing members to other construction.

E. Provide wall returns at ends of wall-mounted handrails.

2.4 FINISHES

A. Steel Railings: Two coats quick-dry enamel over rust-inhibitive primer.

PART 3 - EXECUTION

3.1 INSTALLATION

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

B. Set railings accurately in location, alignment, and elevation and free of rack.

C. Coat concealed surfaces of aluminum that will be in contact with cementitious materials or dissimilar metals, with a heavy coat of bituminous paint.

D. Anchor posts in concrete by forming or core-drilling holes 8 inches deep and 3/4 inch greater than OD of post. Fill annular space between post and concrete with nonshrink, nonmetallic Sika Grout 212 grout.

E. Attach handrails to wall with wall brackets.

END OF SECTION 055200

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Model code evaluation reports for **wood-preservative treated wood, fire-retardant treated wood, engineered wood products, and metal framing anchors.**

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: Provide dressed lumber, S4S, marked with grade stamp of inspection agency.

B. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

2.2 TREATED MATERIALS

A. Preservative-Treated Materials: AWPA C2, **except that lumber not in ground contact and not exposed to the weather may be treated according to AWPA C31 with inorganic boron (SBX).**

1. Use treatment containing no arsenic or chromium.
2. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
3. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

B. Provide preservative-treated materials for **all items indicated on Drawings, and the following:**

1. Wood members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Concealed members in contact with masonry or concrete.
3. Wood framing members that are less than 18 inches above the ground.
4. Wood floor plates that are installed over concrete slabs-on-grade.

C. Fire-Retardant-Treated Materials: Comply with performance requirements in AWPA C20.

1. Use Exterior type for exterior locations and where indicated.
2. Use Interior Type A, High Temperature (HT) for enclosed roof framing, framing in attic spaces, and where indicated.
3. Use Interior Type A, unless otherwise indicated.
4. Identify with appropriate classification marking of a testing and inspecting agency acceptable to authorities having jurisdiction.

D. Provide fire-retardant treated materials for **items indicated on Drawings.**

2.3 LUMBER

A. Dimension Lumber:

1. Maximum Moisture Content: **15 percent for 2-inch nominal thickness or less, 19 percent for 2-inch nominal thickness or less.**
2. Non-Load-Bearing Interior Partitions: **Construction or No. 2: Northern species: NLGA.**
3. Framing Other Than Non-Load-Bearing Partitions: **No. 2: Hem-fir (north): NLGA.**
4. Exposed Framing: Provide material hand-selected for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane.

    a. Species: As specified for framing other than non-load bearing partitions.
    b. Grade: **Select Structural**

B. Exposed Boards: **Eastern white, ponderosa, or sugar pine, Premium or 2 Common (Sterling): NeLMA, NLGA, WCLIB, or WWPA;** with **15** percent maximum moisture content.

C. Concealed Boards: **Eastern softwoods, No. 3 Common: NELMA** with 15 percent maximum moisture content.

D. Miscellaneous Lumber: **Construction, or No. 2** grade with **15** percent maximum moisture content of any species. Provide for nailers, blocking, and similar members.

2.4 ENGINEERED WOOD PRODUCTS

A. Engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be demonstrated by comprehensive testing.

B. Wood I-Joists: Prefabricated units, made with solid or structural composite lumber flanges and wood-based structural panel webs, let into and bonded to flanges. Provide units complying with material requirements of and with structural capacities established and monitored according to ASTM D 5055.

1. Web Material: **Either oriented strand board or plywood, Exposure 1.**
2. Structural Properties: Provide units with depths and design values not less than those indicated.
3. Provide units complying with APA PRI-400, factory marked with nominal joist depth, joist class, span ratings, mill identification, and compliance with APA standard.

C. Rim Boards: Product designed to be used as a load-bearing member and to brace wood I-joists at bearing ends, complying with research/evaluation report for I-joists.

1. Material: **product made from any combination solid lumber, wood strands, and veneers.**
2. Thickness: **1-1/4 inches.**

2.5 PLYWOOD BACKING PANELS

A. Telephone and Electrical Equipment Backing Panels: Plywood, Exposure 1, C-D Plugged, fire-retardant treated, not less than 3/4 inch thick.

2.6 MISCELLANEOUS PRODUCTS

A. Fasteners: Size and type indicated. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners **with hot-dip zinc coating complying with ASTM A 153/A 153M.**

1. Power-Driven Fasteners: CABO NER-272.
2. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

B. Metal Framing Anchors: Structural capacity, type, and size indicated.

1. Use anchors made from hot-dip galvanized steel complying with ASTM A 653/A 653M, G60 coating designation for interior locations where stainless steel is not indicated.
2. Use anchors made from stainless steel complying with ASTM A 666, Type 304 for exterior locations and where indicated.

C. Sill-Sealer: **Glass-fiber insulation, 1-inch thick.**

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Securely attach rough carpentry to substrates, complying with the following:

1. CABO NER-272 for power-driven fasteners.
2. Published requirements of metal framing anchor manufacturer.
3. **Table 2304.9.1, "Fastener Schedule," in the IBC.**

END OF SECTION 061000

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Model code evaluation reports for treated wood.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: Provide dressed lumber, S4S, marked with grade stamp of inspection agency.

2.2 TREATED MATERIALS

A. Preservative-Treated Materials: AWPA C2, **except that lumber not in ground contact and not exposed to the weather may be treated according to AWPA C31 with inorganic boron (SBX).**

1. Use treatment containing no arsenic or chromium.
2. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
3. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

B. Provide preservative-treated materials for **items indicated on Drawings, and the following:**

1. Wood members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Concealed members in contact with masonry or concrete.
3. Wood framing members that are less than 18 inches above the ground.
4. Wood floor plates that are installed over concrete slabs-on-grade.

C. Fire-Retardant-Treated Materials: Comply with performance requirements in AWPA C20.

1. Use Exterior type for exterior locations and where indicated.
2. Use Interior Type A, High Temperature (HT) where indicated.
3. Use Interior Type A, unless otherwise indicated.
4. Identify with appropriate classification marking of a testing and inspecting agency acceptable to authorities having jurisdiction.

D. Provide fire-retardant treated materials for **items indicated on Drawings.**

2.3 LUMBER

A. Dimension Lumber:

1. Maximum Moisture Content: **19** percent.
2. Interior Partition Framing: **Construction, Stud, or No. 2Northern species: NLGA.**
3. Other Framing: **Construction or No. 2: Hem-fir (north): NLGA; Douglas fir-larch: WCLIB, or WWPA.**

B. Exposed Boards: **Eastern white, ponderosa, or sugar pine, Premium or 2 Common (Sterling): NeLMA, NLGA, WCLIB, or WWPA** with **19** percent maximum moisture content.

C. Concealed Boards: **Eastern softwoods, No. 3 Common: NELMA** with **19** percent maximum moisture content.

D. Miscellaneous Lumber: **Construction, or No. 2** grade with **19** percent maximum moisture content of any species. Provide for nailers, blocking, and similar members.

2.4 PLYWOOD BACKING PANELS

A. Telephone and Electrical Equipment Backing Panels: Plywood, Exposure 1, C-D Plugged, fire-retardant treated, not less than 3/4 thick.

2.5 FASTENERS

A. Fasteners: Size and type indicated. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners **with hot-dip zinc coating complying with ASTM A 153/A 153M.**

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

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set miscellaneous rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Securely attach miscellaneous rough carpentry to substrates, complying with the following:

1. CABO NER-272 for power-driven fasteners.
2. **Table 2304.9.1, "Fastener Schedule in the IBC.**

END OF SECTION 061053

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Model code evaluation reports for **preservative-treated plywood, fire-retardant-treated plywood, and building wrap.**

PART 2 - PRODUCTS

2.1 WOOD PANEL PRODUCTS, GENERAL

A. Plywood: DOC PS 1.

B. Oriented Strand Board: DOC PS 2.

2.2 TREATED PLYWOOD

A. Preservative-Treated Plywood: AWPA C9.

1. Use treatment containing no arsenic or chromium.
2. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.

B. Provide preservative treated plywood for **items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.**

C. Fire-Retardant-Treated Plywood: Comply with performance requirements in AWPA C27, labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Use Exterior type for exterior locations and where indicated.
2. Use Interior Type A, High Temperature (HT) for roof sheathing and where indicated.
3. Use Interior Type A, unless otherwise indicated.
4. Identify with appropriate classification marking of a testing and inspecting agency acceptable to authorities having jurisdiction.

D. Provide fire-retardant treated plywood for **items indicated on Drawings.**

2.3 WALL SHEATHING

A. Plywood Wall Sheathing: **Exterior, Structural I** sheathing.

B. Oriented-Strand-Board Wall Sheathing: **Exposure 1, Structural I** sheathing.

C. Gypsum Wall Sheathing:

1. Paper-Surfaced Gypsum Wall Sheathing: ASTM C 79/C 79M or ASTM C 1396/C 1396M, gypsum sheathing; with water-resistant-treated core.

2.4 ROOF SHEATHING

A. Plywood Roof Sheathing: **Exterior, Structural I** sheathing.

B. Oriented-Strand-Board Roof Sheathing: **Exposure 1, Structural I** sheathing.

C. Composite Nail Base Insulated Roof Sheathing: Polyisocyanurate foam with oriented strand board laminated to one face complying with ASTM C 1289, Type V.

2.5 SUBFLOORING AND UNDERLAYMENT

A. Subflooring:

1. Plywood Subflooring: **Exterior, Structural I** single-floor panels or sheathing.

B. Underlayment:

1. Plywood Underlayment for Resilient Flooring: DOC PS 1, **Exterior A-C** with fully sanded face.

2.6 MISCELLANEOUS PRODUCTS

A. Fasteners: Size and type indicated.

1. For roof **and wall** sheathing, provide fasteners **with hot-dip zinc coating complying with ASTM A 153/A 153M.**
2. Power-Driven Fasteners: CABO NER-272.

B. Weather-Resistant Sheathing Paper:

1. Building Paper: ASTM D 226, Type 1 (No. 15 asphalt-saturated organic felt), unperforated.
2. Building Wrap: ASTM E 1677, Type I air retarder; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.

a. Products:

1) Blueskin VP150 Self-Adhered Water Resistive Air Barrier by Henry Company LLC
2) Substitutions in accordance with the requirements of the Project Manual.

C. Sheathing Joint-and-Penetration Treatment Materials:

1. Sealant for Gypsum Sheathing Board: Joint sealant recommended by sheathing manufacturer for application indicated.
2. Sheathing Tape for Gypsum Sheathing Board: Self-adhering glass-fiber tape recommended by sheathing and tape manufacturers for application indicated.

D. Adhesives for Field Gluing Panels to Framing: APA AFG-01.

E. Flexible Flashing: Adhesive rubberized-asphalt compound, bonded to polyethylene film, with an overall thickness of 0.030 inch.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Securely attach to substrates, complying with the following:

1. CABO NER-272 for power-driven fasteners.
2. **Table 2304.10, "Fastening Schedule," in ICC's International Building Code**

B. Fastening Methods:

1. Subflooring:

a. **Glue and nail** to wood framing.
b. Screw to cold-formed metal framing.

2. Wall and Roof Sheathing:

a. **Nail** to wood framing.
b. Screw to cold-formed metal framing.

3. Underlayment:

a. **Nail** to subflooring.

C. Sheathing Joint-And-Penetration Treatment: Seal sheathing joints according to sheathing manufacturer's written instructions.

D. Building Wrap Installation:

1. Apply building wrap immediately after sheathing is installed.
2. Seal seams, edges, fasteners, and penetrations with tape.
3. Extend into jambs of openings and seal corners with tape.

END OF SECTION 061000

SECTION 062000 - FINISH CARPENTRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Samples for **hardwood veneer plywood paneling.**

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Lumber: DOC PS 20 and grading rules of inspection agencies certified by American Lumber Standards Committee Board of Review.

B. Softwood Plywood: DOC PS 1.

C. Hardwood Plywood: HPVA HP-1.

D. MDF: ANSI A208.2, Grade 130, **made with binder containing no urea-formaldehyde resin.**

E. Particleboard: ANSI A208.1, Grade **M-2, made with binder containing no urea-formaldehyde resin.**

F. Melamine-Faced Particleboard: Particleboard complying with ANSI A208.1, Grade M-2, finished on both faces with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

2.2 EXTERIOR FINISH CARPENTRY

A. Exterior Lumber Trim: **Smooth select eastern white or sugar pine.**

1. Maximum Moisture Content: **15** percent.

B. Cellular PVC Exterior Trim: Extruded, expanded PVC with a small-cell microstructure, made from UV- and heat-stabilized, rigid material.

2.3 INTERIOR STANDING AND RUNNING TRIM

A. Interior Softwood Lumber Trim: **Select eastern white or sugar pine.**

1. Maximum Moisture Content: **15** percent.

B. Interior Hardwood Lumber Trim: Clear, kiln-dried, **white maple.**

C. Wood Moldings: WMMPA WM 4 made to patterns in WMMPA WM 12 from kiln-dried stock.

1. Softwood Moldings for Transparent Finish: **Southern pine.**
2. Moldings for Painted Finish: P-Grade **eastern white or sugar pine.**
3. Base: WM **623, ogee** base.
4. Shoe Mold: WM 126, 1/2-by-3/4-inch quarter-round shoe.
5. Casing: WM **366, featheredge** casing.
6. Stop: WM **946, ogee** stop.
7. Chair Rail: WM 297.

D. PVC-Wrapped Moldings: WMMPA WM 2 and made to patterns included in WMMPA WM 12.

1. Base: WM **623, ogee** base.
2. Shoe Mold: WM 126, 1/2-by-3/4-inch quarter-round shoe.
3. Casing: WM **366, featheredge** casing.
4. Stop: WM **946, ogee** stop.
5. Chair Rail: WM 297.

2.4 FIRE-RATED INTERIOR DOOR FRAMES

A. Frames, complete with casings, fabricated from fire-retardant particleboard or fire-retardant MDF with veneered exposed surfaces, or from solid fire-retardant-treated wood. Frames shall be labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, based on testing per **NFPA 252.**

1. Species: **White maple.**
2. Fire Rating: **As indicated.**
3. **[8-3/4 inches (222 mm)].**

2.5 SHELVING AND CLOTHES RODS

A. Shelving: **3/4-inch plastic laminate-faced particleboard with radiused and filled front edge.**

B. Clothes Rods: 1-1/2-inch- diameter, **clear, kiln-dried hardwood.**

C. Shelf Brackets with Rod Support: BHMA A156.16, B04051; prime-painted formed steel.

2.6 STAIRS AND RAILINGS

A. Interior Treads: 1-1/16-inch, clear, kiln-dried, edge-glued, **hard maple** stepping with half-round nosing.

B. Interior Risers: **[13/16-inch , clear, kiln-dried, edge-glued stock matching treads.**

C. Interior Railings: Clear, kiln-dried, **hard-maple** railing stock.

2.7 MISCELLANEOUS MATERIALS

A. Fasteners for Exterior Finish Carpentry: **hot-dip galvanized steel.**

B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer.

1. Use waterproof resorcinol glue for exterior applications.

C. Adhesive for Cellular PVC Trim: Product recommended by trim manufacturer.

D. Installation Adhesive for Foam Plastic Moldings: Product recommended for indicated use by foam plastic molding manufacturer.

E. Insect Screening for Soffit Vents: **Aluminum.**

PART 3 - EXECUTION

3.1 INSTALLATION

A. Condition finish carpentry in installation areas for 24 hours before installing.

B. Prime and backprime lumber for painted finish exposed on the exterior.

C. Install finish carpentry level, plumb, true, and aligned with adjacent materials. Scribe and cut to fit adjoining work. Refinish and seal cuts.

D. Install standing and running trim with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Stagger joints in adjacent and related trim. Cope at returns and miter at corners.

E. Nail siding at each stud. Do not allow nails to penetrate more than one thickness of siding, unless otherwise recommended by siding manufacturer. Seal joints at inside and outside corners and at trim locations.

F. Select and arrange paneling for best match of adjacent units. Install with uniform tight joints.

G. Interior Stairs: Secure treads and risers by gluing and nailing to rough carriages.

1. Closed Stringers: **House treads and risers into wall stringers, glue, and wedge into place.**
2. Open Stringers: Miter risers and stringer at open stringers. Extend tread over open stringers and finish with bullnose edge.

H. Prime and stain all exposed wood finishes.

END OF SECTION 062000

SECTION 064023

INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data for solid-surfacing materials, Shop Drawings and Samples showing the full range of colors, textures, and patterns available for each type of finish.

B. Quality Standard: Architectural Woodwork Institute's "Architectural Woodwork Quality Standards". Verify availability of certification in first paragraph below with local woodworkers before retaining.

C. Forest Certification: Provide woodwork produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

D. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is completed, and HVAC system is operating.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Hardboard: AHA A135.4.

B. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.

C. Particleboard: ANSI A208.1, Grade M-2.

D. Softwood Plywood: DOC PS 1.

E. Hardwood Plywood and Face Veneers: HPVA HP-1, made with adhesive containing no urea formaldehyde.

F. Thermoset Decorative Panels: Comply with LMA SAT - 1.

G. High-Pressure Decorative Laminate: NEMA LD 3.

1. Available Products:

H. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.

1. Products:

2.2 CABINET HARDWARE AND ACCESSORY MATERIALS

A. Butt Hinges: 2-3/4-inch, 5-knuckle steel hinges made from 0.095-inch- thick metal, and as follows:

1. Semiconcealed Hinges for Flush Doors: BHMA A156.9, B01361.
2. Semiconcealed Hinges for Overlay Doors: BHMA A156.9, B01521.

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening.

C. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter

D. Catches: Magnetic catches, BHMA A156.9, B03141

E. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081

F. Drawer Slides: BHMA A156.9, B05091.

1. Box Drawer Slides: Grade 1HD-100.
2. File Drawer Slides: Grade 1HD-200.
3. Pencil Drawer Slides: Grade 1.
4. Keyboard Slides: Grade 1HD-100.
5. Trash Bin Slides: Grade 1HD-200.

G. Drawer Locks: BHMA A156.11, E07041.

H. Grommets for Cable Passage through Countertops: 2-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.

I. Exposed Hardware Finishes: Comply with BHMA A156.18 for BHMA code number indicated.

1. Finish: Satin Stainless Steel: BHMA 630.

J. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated lumber, kiln dried to 15 percent moisture content.

2.3 INTERIOR WOODWORK

A. Complete fabrication to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

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

C. Interior Standing and Running Trim for Transparent Finish: Premium grade, made from White Maple.

D. Interior Standing and Running Trim for Opaque Finish: Premium grade, made from any closed-grain hardwood

E. Flush Wood Paneling for Transparent Finish: Premium grade.

1. Wood Species: White ash, plain sliced.
2. Matching of Adjacent Veneer Leaves: Book match.
3. Veneer Matching within Panel Face: Center-balance match.
4. Panel Matching: Match panels within each area by using sequence-matched, uniform size-sets.

F. Interior Ornamental Work for Transparent Finish: Premium grade, made from White Maple.

G. Interior Ornamental Work for Opaque Finish: Premium grade, made from any closed-grain hardwood.

H. Wood Cabinets for Transparent Finish: Premium grade.

1. AWI Type of Cabinet Construction: Reveal overlay on face frame.
2. WI Construction Style: Style B, Face Frame.
3. WI Door and Drawer Front Style: Reveal overlay.
4. Wood Species and Cut for Exposed Surfaces: White Maple plain sawn.
5. Grain Direction: As indicated.
6. Matching of Veneer Leaves: Book match.
7. Veneer Matching within Panel Face: Center-balance match.
8. Semiexposed Surfaces Other Than Drawer Bodies: [Same species and cut indicated for exposed surfaces.
9. Drawer Sides and Backs: Solid-hardwood lumber, same species indicated for exposed surfaces.
10. Drawer Bottoms: Hardwood plywood.

I. Plastic-Laminate Cabinets: Premium grade.

1. AWI Type of Cabinet Construction: Reveal overlay on face frame.
2. WIC Construction Style: Style B, Face Frame.
3. WIC Door and Drawer Front StyleReveal overlay
4. Laminate Cladding: Horizontal surfaces other than tops, HGS; postformed surfaces, HGP; vertical surfaces, HGS; Edges, HGS; semiexposed surfaces, VGS.
5. Drawer Sides and Backs: Solid hardwood.
6. Drawer Bottoms: Hardwood plywood.

J. Plastic-Laminate Countertops: Premium grade.

1. Laminate Grade: HGS for flat countertops, HGP for post-formed countertops.
2. Grain Direction: Parallel to cabinet fronts.
3. Edge Treatment: Same as laminate cladding on horizontal surfaces.

K. Solid-Surfacing Material Countertops: Premium grade.

1. Solid-Surfacing Material Thickness: 3/4 inch
2. Fabricate tops in one piece with shop-applied backsplashes and edges.
3. Install integral sink bowls in countertops in shop.

2.4 SHOP FINISHING OF INTERIOR ARCHITECTURAL WOODWORK

A. Finishes: Same grades as items to be finished.

B. Finish architectural woodwork at the fabrication shop; defer only final touch up until after installation.

1. Apply one coat of sealer or primer to concealed surfaces of woodwork. Apply two coats to back of paneling and to end-grain surfaces.
2. Apply a vinyl wash coat to woodwork made from closed-grain wood before staining and finishing.
3. After staining, if any, apply paste wood filler to open-grain woods and wipe off excess. Tint filler to match stained wood.

C. Transparent Finish: AWI finish system synthetic penetrating oil

PART 3 - EXECUTION

3.1 INSTALLATION

A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.

B. Install woodwork to comply with referenced quality standard for grade specified.

C. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches

D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Fasten with countersunk concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed nailing, countersunk and filled flush with woodwork.

F. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Do not use pieces less than 36 inches long, except where shorter single-length pieces are necessary. Scarf running joints and stagger in adjacent and related members.

G. Anchor paneling to supports with concealed panel-hanger clips and by blind nailing on back-up strips, splined-connection strips, and similar associated trim and framing.

H. Cabinets: Install so doors and drawers are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation.

1. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with toggle bolts through metal backing or metal framing behind wall finish.

I. Anchor countertops securely to base units. Seal space between backsplash and wall.

END OF SECTION 064023

SECTION 06 6000

CELLULAR PVC FABRICATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Cellular PVC fabrications including the following:
   1. Trim.
   2. Mouldings.

1.2 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry.

B. Section 06 20 00 - Finish Carpentry.

1.3 REFERENCES

A. ASTM International (ASTM): ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with requirements of authorities having jurisdiction and applicable codes at the location of the project.

B. Manufacturer Qualifications: Minimum 5 years experience manufacturing similar products.

C. Installer Qualifications: Minimum 2 years experience installing similar products.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Comply with manufacturer's recommendations. Handle materials to avoid damage.

1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.8 WARRANTY

A. Provide manufacturer's standard limited warranty for products, stating that components will be free from defects in material that occur as a direct result of the manufacturing process, occur under normal use and service, occur during the warranty period and result in blistering, peeling, flaking, cracking, splitting, cupping, rotting or structural defects from termites or fungal decay.
   1. Azek Trim Warranty Period: 25 years.
   2. Azek Moulding Warranty Period: 25 years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Azek Building Products, Inc., which is located at: 894 Prairie Ave.; Wilmington, OH 45177; Toll Free Tel: 877-ASK-AZEK; Tel: 570-346-8797; Fax: 570-346-5080; Email: request info (raymond.bielawski@cpgbp.com); Web: www.azek.com | timbertech.com

B. Substitutions: Under provisions of Division 01.

2.2 TRIM

A. Fire Performance Characteristics: Provide products complying with the following:
   1. Flame Spread Index: Less than 25, ASTM E 84.

B. PVC Trim: Material shall have the following characteristics:
   1. Material: Solid Cellular PVC.
   2. Trim Size: 5/8 Thickness.

2.3 MOULDINGS

A. Detail Profiles: Material shall have the following characteristics:
   1. Material: Solid Cellular PVC.
   2. Detail Profile:
      a. Water Table: 2-3/4 inches x 2" x 18 feet, AZM-6935.

2.4 ACCESSORIES

A. Fasteners: Stainless steel or hot-dip galvanized, with thin shank, blunt point, full round head as recommended by the manufacturer.

B. Adhesives: Azek Adhesive, a non-toxic, odorless, UV stable, water-based PVC cement.

C. Sealants: Urethane, polyurethane or acrylic based sealants without silicone.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which Work is to be performed and identify conditions that may be detrimental to proper or timely completion.

B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install products in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
   1. Use manufacturer's recommended fasteners, not more than 2 inches from ends.
   2. Glue joints to eliminate joint separation.
   3. Allow for expansion and contraction at ends of the runs.

3.3 CLEANING AND PROTECTION

A. Protect from damage during construction operations. Promptly repair any damaged surfaces. Remove and replace work which cannot be satisfactorily repaired.

B. Clean products, prior to Substantial Completion, using materials recommended by the manufacturer to remove stains, dirt and debris prior to final acceptance.

END OF SECTION 06 6000

SECTION 071113 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 BITUMINOUS DAMPPROOFING

A. Cold-Applied, Emulsified-Asphalt Dampproofing:

1. **Available** Manufacturers:

2. Trowel Coats: ASTM D 1227, Type II, Class 1.
3. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1.
4. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

B. Cut-Back Asphalt Primer: ASTM D 41.

C. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended by manufacturer.

D. Asphalt-Coated Glass Fabric: ASTM D 1668, Type I.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Clean substrates of projections and substances detrimental to work; fill voids, seal joints, and apply bond breakers if any, as recommended by prime material manufacturer.

B. Comply with manufacturer's written recommendations unless more stringent requirements are indicated or required by Project conditions to ensure satisfactory performance of dampproofing.

C. Apply dampproofing to footings and foundation walls where opposite side of wall faces **building interior**.

1. Apply from finished-grade line to top of footing, extend over top of footing, and down a minimum of 6 inches over outside face of footing.
2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where shown as "reinforced," by embedding an

8-inch- wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.

D. Apply dampproofing to provide continuous plane of protection on exterior face of inner wythe of exterior masonry cavity walls.

1. Lap dampproofing at least 1/4 inch onto flashing and items that penetrate inner wythe.
2. Extend dampproofing over outer face of structural members and concrete slabs.

E. Apply dampproofing to provide continuous plane of protection on interior face of above-grade, exterior **masonry** walls unless walls are indicated to receive direct application of paint.

F. Cold-Applied Emulsified-Asphalt Dampproofing:
1. On unparged masonry foundation walls, apply primer and two brush or spray coats, primer and one fibered brush or spray coat, or primer and one trowel coat.
2. On Unexposed Face of Concrete Retaining Walls: Apply one brush or spray coat.
3. On Exterior Face of Inner Wythe of Cavity Walls: Apply primer and one brush or spray coat.
4. On Interior Face of Exterior Concrete Walls: Where above grade and indicated to be furred and finished, apply one brush or spray coat.
5. On Interior Face of **Single-Wythe** Exterior Masonry Walls: Where above grade and indicated to be furred and finished, apply primer and one brush or spray coat.

END OF SECTION 071113

SECTION 071326 - SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: **Product Data.**

B. Installer Qualifications: Authorized, approved, or licensed by waterproofing manufacturer.

PART 2 - PRODUCTS

2.1 WATERPROOFING MATERIALS

A. Rubberized-Asphalt Sheet: 60-mil- thick, self-adhering sheet consisting of 56 mils of rubberized asphalt laminated to a 4-mil- thick, polyethylene film with release liner on adhesive side.

1. Products:

a. Ice & Water Shield by WR Grace

b. Substitutions in accordance with the requirements of this Project Manual.

B. Auxiliary Materials: Primer, surface conditioner, liquid membrane, substrate patching membrane, sheet strips, mastic, adhesives, tape, and metal termination bars recommended by waterproofing manufacturer.

1. Primer: Liquid **waterborne** primer recommended for substrate.
2. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate.

C. Protection Course: **Semirigid sheet with reinforced asphaltic core, 1/8 inch thick.**

PART 3 - EXECUTION

3.1 INSTALLATION

A. Clean, prepare, and treat substrates. Provide clean, dust-free, and dry substrates for waterproofing application.

B. Remove oil, form-release agents, curing compounds, and other contaminants or coatings.

C. Remove projections and fill honeycomb, aggregate pockets, holes, and other voids.

D. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks.

E. Apply primer to substrates at required rate and allow it to dry.

F. Install self-adhering sheet waterproofing according to manufacturer's written instructions and recommendations in ASTM D 6135.

G. Apply and firmly adhere sheets. Accurately align sheets and maintain uniform 2-1/2-inch-minimum lap widths and end laps. Overlap and seal seams and stagger end laps.

H. Prepare, prime, and treat inside and outside corners according to ASTM D 6135.

I. Prepare, treat, and seal surfaces at terminations, penetrations, drains, and protrusions according to ASTM D 6135.

J. Repair tears, voids, and lapped seams not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheets extending 6 inches beyond repaired areas in all directions.

K. Install **protection course** over waterproofing membrane immediately. Use adhesive or tape applied according to manufacturer's written instructions. Do not penetrate waterproofing.

1. Lap edges and ends of geotextile to maintain continuity.

END OF SECTION 071326

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

B. Surface-Burning Characteristics: ASTM E 84, and as follows:

1. Flame-Spread Index: 25 or less where exposed; otherwise, as indicated in Part 2 "Insulation Products" Article.
2. Smoked-Developed Index: 450 or less.

PART 2 - PRODUCTS

2.1 INSULATION PRODUCTS

A. Extruded-Polystyrene Board Insulation: ASTM C 578, **Type V**, with flame-spread index of 75 or less.

B. Molded-Polystyrene Board Insulation: ASTM C 578, **Type II**, with flame-spread index of 75 or less.

C. Flexible Glass-Fiber-Board Insulation: ASTM C 612, Type IA or ASTM C 553, Types I, II, and III; **foil faced**; nominal density of 1.5 lb/cu. ft., with flame-spread index of 25 or less.

D. Glass-Fiber-Board Insulation: ASTM C 612, Type IA or Types IA and IB; **foil faced**; nominal density of **3 lb/cu. ft**, with flame-spread index of 25 or less.

E. Slag-Wool-Fiber/Rock-Wool-Fiber Board Insulation: ASTM C 612, **foil faced on 1 side**; nominal density of **6 lb/cu. ft**, with flame-spread index of 25 or less.

F. Mineral-Fiber-Blanket Insulation: ASTM C 665, **Type I, unfaced** with fibers manufactured from **glass, slag wool, or rock wool**, with flame-spread index of 25 or less.

G. Cellulosic-Fiber Loose-Fill Insulation: ASTM C 739; chemically treated for flame-resistance, processing, and handling characteristics.

H. Glass-Fiber Loose-Fill Insulation: ASTM C 764, **Type 1, pneumatic** application, with flame-spread index of 25 or less.

2.2 ACCESSORIES

A. Sheet Radiant Barrier: ASTM C 1313, **foil on one side**, flame-spread index of 25 or less, and water-vapor transmission of **5 perms or greater**.

B. Vapor Retarder: **Polyethylene Fire-retardant, reinforced polyethylene, 6 mils** thick.

C. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed to fit between roof framing members and to provide cross-ventilation between attic spaces and vented eaves.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install insulation in areas and in thicknesses indicated or required to produce R-values indicated. Cut and fit tightly around obstructions and fill voids with insulation.

B. Except for loose-fill insulation and insulation that is friction fitted in stud cavities, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

C. Place loose-fill insulation to comply with ASTM C 1015.

1. Comply with the CIMA's Special Report #3, "Standard Practice for Installing Cellulose Insulation."

D. Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage. Locate seams at framing members, overlap, and seal with tape.

END OF SECTION 072100

SECTION 073113 - ASPHALT SHINGLES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data **and Samples**.

B. Identify each bundle of shingles with appropriate markings of UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, **Class A**.
2. Wind-Resistance-Test Characteristics: ASTM D 3161 or UL 997, passed.

C. Warranties: Provide standard manufacturer's written warranty, signed by manufacturer agreeing to promptly repair or replace asphalt shingles that fail in materials **or workmanship** within **[25] 30** years from date of Substantial Completion, prorated, with first **3** years nonprorated.

PART 2 - PRODUCTS

2.1 ASPHALT SHINGLES

A. Fiberglass Shingles: ASTM D 3462 and as follows:

1. Laminated-Strip Asphalt Shingles: Laminated, multi-ply overlay construction, mineral-granule surfaced, and self-sealing. **Straight** cut butt edge.
2. Multitab-Strip Asphalt Shingles: Mineral-granule surfaced and self-sealing. **Three tabs, regularly** spaced with **straight** butt edge.
3. No-Cutout-Strip Asphalt Shingles: Mineral-granule surfaced, self-sealing, square, and single tab. **Straight** butt edge.

B. Products:

1. Timberline Ultra HD by GAF.

2. Approved Substitutes as permitted by the Project Manual.

2.2 ACCESSORIES

A. Felts: **ASTM D 226, Type I**, asphalt-saturated organic felts.

B. Self-Adhering Sheet Underlayment: ASTM D 1970, SBS-modified asphalt; mineral-granule or slip-resisting-polyethylene surfaced; with release paper backing; cold applied.

C. Ridge Vent: Rigid UV-stabilized plastic ridge vent **with nonwoven geotextile filter strips**; for use under ridge shingles.

D. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.

E. Roofing Nails: Aluminum, stainless-steel, or hot-dip galvanized-steel shingle nails, minimum 0.120-inch diameter, of sufficient length to penetrate 3/4 inch into solid wood decking or extend at least 1/8 inch through OSB or plywood sheathing.

F. Sheet Metal Flashing and Trim: Comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim."

1. Sheet Metal: **Aluminum**.
2. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual."
3. Drip Edge: Formed sheet metal with at least a 2-inch roof deck flange and a 1-1/2-inch fascia flange with a 3/8-inch drip at lower edge.
4. Open-Valley Flashing: Fabricate with 1-inch- high inverted-V profile at center of valley and equal flange widths of **10 inches**.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with recommendations in ARMA's "Residential Asphalt Roofing Manual" and with asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."

B. Apply self-adhering sheet underlayment at eaves and rakes from edges of roof to at least **24 inches** inside exterior wall line.

C. Apply self-adhering sheet underlayment at valleys extending 18 inches on each side.

D. Install valleys complying with ARMA and NRCA instructions. Construct **sheet metal open** valleys.

E. Install metal flashings and other sheet metal to comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim," recommendations in ARMA's "Residential Asphalt Roofing Manual," and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."

F. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.

END OF SECTION 073113

SECTION 074600 - SIDING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and Samples.

1. Submit research/evaluation reports from a model code organization acceptable to authorities having jurisdiction.

B. Warranties: Manufacturer's standard from in which siding manufacturer agrees to repair or replace siding that fails in materials or workmanship within 20 years. Failures include, but are not limited to, cracking, deforming, fading, or otherwise deteriorating beyond normal weathering.

PART 2 - PRODUCTS

2.1 SIDING

A. Cedar Shake Vinyl Siding: ASTM D 3679, integrally colored.

1. Products:

a. Cedar Impressions 7" Shake by Certainteed Corporation.

b. Substitutions in accordance with the requirements of the Project Manual.

B. Board and Batten Vinyl Siding: ASTM D 3679, integrally colored.

1. Products:

a. CedarBoards S12 Insulated Siding by Certainteed Corporation.

b. Substitutions in accordance with the requirements of the Project Manual.

2.2 SOFFIT

A. Vinyl Soffit: ASTM D 4477, integrally colored.

1. Products:

a. Azek Vented ½"x12" Soffit by Azek Building Products, Inc.

b. Substitutions in accordance with the requirements of the Project Manual.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install vinyl siding, soffit, and accessories according to ASTM D 4756.

B. Install aluminum siding, soffit, and accessories according to AAMA 1402.

END OF SECTION 074600

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and product certificates signed by manufacturer certifying that products furnished comply with requirements.

B. Provide firestopping systems with fire-resistance ratings indicated by reference to UL designations as listed in its "Fire Resistance Directory," or to designations of another testing agency acceptable to authorities having jurisdiction.

C. Provide through-penetration firestopping systems with F-ratings indicated, as determined according to ASTM E 814, but not less than fire-resistance rating of construction penetrated.

1. Provide through-penetration firestopping systems with T-ratings as well as F-ratings, as determined according to ASTM E 814, where indicated.

D. For exposed firestopping, provide products with flame-spread indexes of less than 25 and smoke-developed indexes of less than 450, as determined according to ASTM E 84.

PART 2 - PRODUCTS

2.1 FIRESTOP SYSTEMS

A. Any through-penetration firestop system that is **classified by UL** for the application and with F-rating **and T-rating** indicated may be used.

B. **UL-classified** system designations are indicated on Drawings.

C. Firestop Systems with No Penetrating Items: 1479

D. Firestop Systems for Metallic Pipes, Tubing, or Conduit: WL-1164

E. Firestop Systems Nonmetallic Pipes, Tubing, or Conduit: W-L-2144

F. Firestop Systems Insulated Pipes: C-AJ-5096

G. Firestop Systems for Electrical Cables: W-L-3068

H. Firestop Systems for Air Ducts: W-L-7040

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install firestopping systems to comply with requirements listed in testing agency's directory for indicated fire-resistance rating.

B. Identification: Identify through-penetration firestop systems with permanent labels attached to surfaces adjacent to firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:

1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb."
2. Classification/listing designation of applicable testing and inspecting agency.
3. Through-penetration firestop system manufacturer's name and product name.

END OF SECTION 078413

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and color Samples.

B. Environmental Limitations: Do not proceed with installation of joint sealants when ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 deg F.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS

A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under service and application conditions.

B. Sealant for Use in Building Expansion Joints:

1. Single-component, neutral-curing silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; Uses T, M, and O, with the additional capability to withstand **50 percent movement in both extension and compression for a total of 100 percent movement.**

C. Sealant for General Exterior Use Where Another Type Is Not Specified:
1. Single-component, neutral-curing silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; Uses T, NT, M, G, A, and O.

D. Sealant for Exterior Traffic-Bearing Joints, Where Slope Precludes Use of Pourable Sealant:

1. Single-component, nonsag urethane sealant, ASTM C 920, Type S; Grade NS; Class 25; Uses T, NT, M, G, A, and O.

E. Sealant for Exterior Traffic-Bearing Joints, Where Slope Allows Use of Pourable Sealant:

1. Single-component, pourable urethane sealant, ASTM C 920, Type S; Grade P; Class 25; Uses T, M, G, A, and O.

F. Sealant for Use in Interior Joints in Ceramic Tile and Other Hard Surfaces in Kitchens and Toilet Rooms and Around Plumbing Fixtures:

1. Single-component, mildew-resistant silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; Uses NT, G, A, and O; formulated with fungicide.

G. Sealant for Interior Use at Perimeters of Door and Window Frames:

1. Latex sealant, single-component, nonsag, mildew-resistant, paintable, acrylic-emulsion sealant complying with ASTM C 834.

2.2 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer.

B. Cylindrical Sealant Backings: ASTM C 1330, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with ASTM C 1193.

B. Comply with ASTM C 919 for use of joint sealants in acoustical applications.

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and Shop Drawings.

B. Comply with ANSI/SDI A250.8.

C. Fire-Rated Doors and Frames: Labeled by a testing and inspecting agency acceptable to authorities having jurisdiction based on testing per **NFPA 252 at positive pressure**

1. At stairs and exit passageways, provide doors that have a temperature rise rating of 450 deg F.

D. Smoke-Control Door Assemblies: Comply with **NFPA 105 or UL 1784.**

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cold-Rolled Steel Sheets: ASTM A 1008/A 1008M, suitable for exposed applications.

B. Hot-Rolled Steel Sheets: ASTM A 1011/A 1011M, free of scale, pitting, or surface defects.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, with G40.

D. Frame Anchors: ASTM A 591/A 591M, 4OZ coating designation; mill phosphatized.

1. For anchors built into exterior walls, sheet steel 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.

2.2 HOLLOW METAL DOORS AND FRAMES

A. Doors: Complying with ANSI 250.8 for level and model and ANSI A250.4 for physical-endurance level indicated, 1-3/4 inches thick unless otherwise indicated.

1. Interior Doors: **Level 1 and Physical Performance Level C (Standard Duty).**
2. Exterior Doors: [**Level 2 and Physical Performance Level B (Heavy Duty),** metallic-coated steel sheet faces.

a. Thermal-Rated (Insulated) Doors: Where indicated, provide doors with thermal-resistance value (R-value) of not less than **4.0 deg F x h x sq. ft./Btu** when tested according to ASTM C 1363.

3. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as door face sheets.

B. Frames: ANSI A250.8; conceal fastenings unless otherwise indicated.

1. Steel Sheet Thickness for Interior Doors: **0.042 inch**.
2. Steel Sheet Thickness for Exterior Doors: **0.053 inch**.
3. Fabricate interior frames with mitered or coped **and continuously welded corners**.
4. Fabricate exterior frames from metallic-coated steel sheet, with mitered or coped and continuously welded corners.
5. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.
6. Frame Anchors: Not less than 0.042 inch thick.

C. Glazing Stops: Nonremovable stops on outside of exterior doors and on secure side of interior doors; screw-applied, removable, glazing stops on inside, fabricated from same material as door face sheet in which they are installed.

D. Door Louvers: **Light** proof per SDI 111C.

1. Fire-Rated Automatic Louvers: Actuated by fusible links and listed and labeled.

E. Door Silencers: Three on strike jambs of single-door frames and two on heads of double-door frames.

F. Grout Guards: Provide where mortar might obstruct hardware operation.

G. Prepare doors and frames to receive mortised and concealed hardware according to ANSI A250.6 and ANSI A115 Series standards.

H. Reinforce doors and frames to receive surface-applied hardware.

I. Prime Finish: Manufacturer's standard, factory-applied coat of lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install hollow metal frames to comply with ANSI/SDI A250.11.

1. Fire-Rated Frames: Install according to NFPA 80.

B. Install doors to provide clearances between doors and frames as indicated in ANSI/SDI A250.11.

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. **Use galvanizing repair paint for metallic coated surfaces.**

END OF SECTION 081113

SECTION 08 1613

FIBERGLASS (FRP) DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Fiberglass Reinforced Plastic (FRP) Doors.
2. Fiberglass Reinforced Plastic (FRP) Frames.
3. Fire Rated Fiberglass Reinforced Plastic (FRP) Doors.
4. Fire Rated Fiberglass Reinforced Plastic (FRP) Frames.

B. Related Sections include but are not limited to:
1. General Conditions
2. Section 04200 - Unit Masonry.
3. Section 08710 - Finish Hardware.
4. Section 08800 - Glass and Glazing.
5. Section 09900 - Painting and Coating: Field Finishing.

1.2 SUBMITTALS

A. Submit shop drawings and product technical data in accordance with Section 01300.

B. Product Data:
1. Manufacturer's detailed specification of construction and fabrication.
2. Installation instructions.

C. Shop Drawings. Indicate the following:
1. Location, size, finish and hand of each door.
2. Elevation of each door type.
3. Internal reinforcement.
4. Frame configuration, elevation, finish and anchor types.

1.3 DELIVERY, STORAGE AND PROTECTION

A. Deliver door and frame assemblies packaged in manufacturer's standard containers to provide protection during transit. Store, protect and handle products at project site in strict accordance with manufacturer's instructions to prevent damage to the finish of factory-finished doors and frames.

B. Inspect doors and frames on delivery for damage, and notify shipper and supplier if damage exists. Minor damages may be repaired provided refinished items match new work and are acceptable to the Architect. Remove and replace damaged items that cannot be repaired as directed.

C. Store doors and frames at building under cover. Avoid using non-vented plastic or canvas covers that could create a humidity chamber.

1.4 REGULATORY REQUIREMENTS

A. Fire-rated door and frame construction will conform to tested products under ASTM E152, NFPA 252 & UL10C.

B. Install door and frame assembly in conformance with NFPA 80 for fire-rated class, ANSI A117.1 specifications for ADA requirements, handicap accessibility.

C. A flame spread classification of 25 or less per ASTM E84 will apply to all FRP component parts and shall be self extinguishing per ASTM D635.

D. If the application dictates, resin formulation will conform to USDA and FDA standards for incidental food contact.

E. E. Swinging Door Test, Doors and Frames, AAMA 920-03, ANSI A250.4-2001 (supercedes ANSI A-151.1), NWWDA TM-7: In excess of 1,000,000 cycles.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturer is acceptable:

1. Tiger Door, 1181 Garden Street, Greensburg, PA 15601, Telephone: (724) 832-4416, toll-free (888) 891-4416, fax (724) 837 3759, Email: www.tigerdoor.com .

2. Substitutions As provided for in this Project Manual.

2.2 FIRE RATED AND NON-RATED DOORS

A. Fiberglass Reinforced Plastic Doors

1. Face Panels: Standard face panels shall be chemical resistant, using a fiberglass-reinforced polyester resin system with light stabilizing additives. Thickness of panels shall be 0.090 to 0.125, with a standard of 0.120".

2. Door Thickness: 1 ¾".

3. Finish: All surfaces shall have a textured, semi-gloss, seamless gel coat finish. Gel Coat coverage shall be 15 mil thick plus or minus 3 mils.

4. Color: As selected by architect from manufacturer's standard, optional or custom colors. Optional primer finish for field painting.

B. Internal Construction

1. Stiles and Rails shall be constructed of rectangular and square high modulus pultruded fiberglass tubes.

2. Core material as application dictates.
   a) Honeycomb Core, Phenolic impregnated resin honeycomb
   b) Polyurethane Foam Core, 1 ½" thick rigid block of polyurethane with an "R" factor of 11-12 shall be laminated to the interior of the face panels.
   c) Mineral Core, fire rated up to 90 minutes.

3. Internal reinforcements for full mortise hinges to be solid FRP blocking and for thru-bolted hardware to be high modulus pultrusions.

C. Door Accessories

1. Windows: Glazing support structures and window lite retainers shall be fabricated from high modulus pultrusions and/or fiberglass composition common to the door construction. The opening itself shall be sealed in such a manner as to prevent moisture or contaminants from penetrating the interior of the door. Polyvinyl window retainers will not be acceptable.

2. Louvers: Door louvers shall be factory-furnished and installed, constructed using FRP material in an inverted "v" type design and will adhere to the same guidelines as window openings above.

3. Transoms: All transom panels will be identical to the doors in materials, construction, thickness, finish and color.

4. Astragals: Astragals for pairs of doors will be fabricated of FRP material in the manufacturer's standard design.

5. Fire rated door accessories will be manufactured or supplied in compliance with the labeling agency and in accordance with UL10C.

2.3 FIRE RATED AND NON-RATED FRP FRAMES

A. General: Fabricate frames of fiberglass reinforced plastic.

1. Head and Jamb: Pultruded fiberglass reinforced plastic, minimum ¼" wall thickness, conforming to SDI requirements.

2. Frame Profile: Double rabbeted with 5/8" stop. Face will be 2" with a standard jamb depth of 5 ¾".

3. Joint Connection: Jamb to Head joints will be neatly mitered at 45 degrees

4. Finish: 15 mil +/- 3 mil gel coat finish. Color to match door unless otherwise indicated.

5. Fire rated frames will be FRP, similar to non-rated frames in manufacture and appearance and shall be in compliance with the labeling agency and in accordance with UL10C. Fire rated frames manufactured in a material other than fiberglass will not be accepted.

B. Reinforcements

1. Corner: Reinforcement at frame corner will be pultruded fiberglass angle, 4" x 4" x 5 3/8" x ¼".

2. Hardware: Frames will incorporate non-woven polyester fabric at mortise hinge, closer and strike locations for unparalleled screw-holding strength.

C. Anchoring Systems

1. New & Existing Masonry
   a. Galvanized Wire
   b. FRP Base Anchor

2. Existing Masonry
   a. #14-10x3-3/4" Crete Flex Masonry Screw

b. FRP Base Anchor

3. Stud Wall (Metal or Wood)
   a. ¼-20x2-3/4" SS Phillips Head Machine Screw
   b. FRP Base Anchor

2.4 FABRICATION

A. Fabricate FRP doors and frames rigid, neat in appearance and free from defects.

B. Form to sizes and profiles as indicated on drawings.

C. In compliance with the hardware manufacturer's instructions and templates, doors and frames shall be mortised and reinforced for hardware, including hinges, locks, strikes, closers, etc.

D. Bottom of frames will terminate at the indicated finished floor level.

E. Clearances will be as follows:

1. Jambs and Head: 1/8 inch plus or minus 1/16 inch

2. Between Edges and Pairs of Doors: 1/8 inch plus or minus 1/16 inch

3. Between Bottom of Door and Threshold: Maximum 3/8 inch

4. Between Bottom of Door and Top of Finish Floor: Maximum ¾ inch

PART 3 EXECUTION

3.1 INSPECTION

A. Installer shall meet local building standards requirements and shall examine substrates, areas, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of fiberglass doors and frames and shall submit a written report if the conditions are unacceptable. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install doors and frames plumb, rigid, properly aligned and securely fastened in place. Install in accordance with manufacturer's instructions and NFPA 80 standards at fire rated openings.

B. Where applicable, set frames in place prior to construction of enclosing walls and ceilings. Space between wall and frame may be solidly filled with mortar and anchors built into the joints as the walls are constructed.

C. Check plumb, squareness and twist of frames as walls are constructed. Brace securely until permanently anchored. Shim as necessary to comply with installation tolerances.

D. Remove temporary braces and spreaders necessary for installation only after frames have been properly set and secured.

E. Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
   1. Three anchors per jamb from 60 to 90 inches in height,

2. Four anchors per jamb from 90 to 96 inches in height.

F. Protect frames during construction.

G. Align doors in frames for uniform clearances at each edge..

3.3 ADJUSTING

A. Adjust doors in accordance with door manufacturer's maintenance instructions to swing open and shut without binding and to remain in place at any angle without being moved by gravitational influence.

B. Adjust door hardware to operate correctly in accordance with hardware manufacturer's maintenance instructions Contact Simon Door Co. if help is required with hardware installation instructions; do not alter doors to fit hardware without prior approval.

3.4 CLEANING

A. Clean all exposed surfaces, removing dirt and excess sealant from all exposed surfaces. Follow the manufacturer's maintenance instructions for proper techniques and products to clean all surfaces.

B. Remove debris and leave work in complete and proper operating conditions.

3.5 WARRANTY

A. Fiberglass doors and frames shall carry a lifetime warranty against failure due to corrosion from the specific environment named at the time of purchase. Manufacturer's written warranty and conditions will apply to all products contained in this section.

END OF SECTION 08 1613

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

B. Fire-Rated Access Doors and Frames: Labeled by a testing and inspecting agency acceptable to authorities having jurisdiction based on testing per the following:

1. Vertical Access Doors: **NFPA 252.**
2. Horizontal Access Doors and Frames: **ASTM E 119.**

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel Sheets: ASTM A 1008/A 1008M or ASTM A 591/A 591M.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, with A60 or G60 coating.

C. Stainless-Steel Sheets: ASTM A 666, Type 304, with No. 4 directional satin finish.

2.2 ACCESS DOORS AND PANELS

A. Flush Access Doors and Frames with Exposed Trim: **Prime-painted steel** units.

B. Flush Access Doors and Trimless Frames: **Prime-painted steel** units with **drywall** bead flange.

C. Recessed Access Doors and Trimless Frames: **Prime-painted steel** units **with drywall bead for gypsum board surfaces.**

D. Fire-Rated, Insulated, Flush Access Doors and Frames with Exposed Trim: **Prime-painted steel**, self-latching units with automatic closer.

E. Fire-Rated, Insulated, Flush Access Doors and Trimless Frames: **Prime-painted steel**, self-latching units with automatic closer.

F. Fire-Rated, Uninsulated, Flush Access Doors and Frames with Exposed Trim: **Prime-painted steel**, self-latching units with automatic closer.

G. Locks: Flush to finished surface, **key** operated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install access doors and panels accurately in position. Adjust hardware and door and panels for proper operation.

B. Install fire-rated access doors and panels according to NFPA 80.

END OF SECTION 083113

SECTION 08 3313

OVERHEAD COILING COUNTER DOORS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Structural Performance: Design and reinforce overhead coiling doors to withstand a **20 lbf/sq. ft.** wind-loading pressure in conformance to ASTM E 330.

B. Submittals: Product Data and Shop Drawings.

C. Where fire doors are required, provide assemblies that comply with NFPA 80 that are identical to door and frame assemblies tested for fire-test-response characteristics per UL 10B, and that are labeled and listed for fire ratings indicated by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. For units exceeding sizes of tested assemblies, provide certification by testing and inspecting agency that doors comply with all requirements of tested assemblies, except for size.

D. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

1.2 COORDINATION

A. Coordinate Work with other operations and installation of adjacent materials to avoid damage to installed materials.

1.3 WARRANTY

A. Warranty: Manufacturer's limited door system warranty for 2 years for all parts and components.

PART 2 - PRODUCTS

2.1 OVERHEAD COILING DOORS

A. Overhead Coiling Counter Door:

1. Overhead Door Corp. Model #655
Overhead Door Corp., 2501 S. State Hwy. 121, Suite 200, Lewisville, TX 75067.
Tel: (800) 275-3290 Website: www.overheaddoor.com. Email: info@overheaddoor.com

2. Substitutions in accordance with the requirements of this Project Manual.

3. Type: **Annodized Aluminum with integral Stainless Steel frame, between-jamb mount.**

4. Door Curtain Slats: **F265 flat-profile insulated slats.**

5. Operation: **Push-up.**

6. Locking: **Padlock Slidebolts.**

7. Tracks, Supports, and Hardware: Manufacturer's standard.

8. Weatherseals: Provide replaceable weather stripping at bottom and at top of exterior doors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify opening sizes, tolerances and conditions are acceptable.

B. Examine condition of substrates, supports and other conditions under which this work is to be performed.

C. Notify Architect of unsatisfactory preparation before proceeding.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install door, track, and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports.

C. Install fire-rated doors to comply with NFPA 80.

D. Instruct Owner in proper operating procedures and maintenance schedule.

END OF SECTION 08 3313

SECTION 085200 - WOOD WINDOWS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data, **Shop Drawings, and color Samples.**

B. Quality Standard: Comply with AAMA/NWWDA 101/I.S.2/NAFS.

1. Provide AAMA- or WDMA-certified wood windows with an attached label.

PART 2 - PRODUCTS

2.1 WOOD WINDOWS

A. Products:

1. Anderson 400 Series Stormwatch by Anderson Corporation.
2. Substitutions in accordance with the requirements of the Project Manual.

B. Provide **vinyl-clad** wood windows.

C. Window Types: **As indicated on Drawings.**

D. Performance Class: **R.**

E. Performance Grade: **50.**

F. Thermal Transmittance: Whole-window U-factor not more than **0.40 Btu/sq. ft. x h x deg F** at 15-mph wind velocity and winter temperatures per **AAMA 1503.**

G. Solar Heat-Gain Coefficient: Whole-window SHGC not more than **0.40**, per NFRC 200.

H. Trim: Provide indicated trim, matching material and finish of frame members.

I. Equip units with **vinyl-coated, glass-fiber** mesh insect screens on operable sashes.

J. Equip units with removable grilles as indicated, attach to inside face of each lite.

K. Exterior Color: To be selected by Architect from the Manufacturer's full range of colors.

L. Glaze units with **low-e coated, argon-filled,** sealed insulating glass, complying with Division 08 Section "Glazing."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set units level, plumb, and true to line, without warp or rack of frames and panels. Provide proper support and anchor securely in place.

B. Set sill members in bed of sealant or with gaskets, as indicated, to provide weathertight construction.

C. Adjust operating panels, screens, and hardware to provide a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

D. Clean glass **and vinyl** surfaces immediately after installing windows. Remove nonpermanent labels from glass surfaces.

END OF SECTION 085200

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Allowances: Provide hardware under Hardware Allowance in Division 01 Section "Price and Payment Procedures."

B. Submittals: Hardware schedule.

C. Deliver keys to Owner.

D. Fire-Resistance-Rated Assemblies: Provide products that comply with NFPA 80 and are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for applications indicated. On exit devices provide label indicating "Fire Exit Hardware."

PART 2 - PRODUCTS

2.1 HARDWARE

A. Manufacturers:

1. Schlage
2. Stanley
3. Ives/Ingersoll Rand
4. Assa/Abbloy
5. Substitutions in accordance with the requirements of the Project Manual.

B. Hinges:

1. **Stainless-steel** hinges with stainless-steel pins for exterior.
2. Nonremovable hinge pins for exterior and public interior exposure.
3. Ball-bearing hinges for doors with closers and entry doors.
4. 2 hinges for 1-3/8-inch- thick wood doors.
5. 3 hinges for 1-3/4-inch- thick doors 90 inches or less in height; 4 hinges for doors more than 90 inches in height.

C. Locksets and Latchsets:

1. BHMA A156.2, Series 4000, **Grade 1** for bored locks and latches.
2. BHMA A156.3, Grade 1 for exit devices.

3. BHMA A156.5, **Grade 1** for auxiliary locks.
4. BHMA A156.12, Series 5000, **Grade 1** for interconnected locks and latches.
5. BHMA A156.13, Series 1000, **Grade 1** for mortise locks and latches.
6. **Lever handles** on locksets and latchsets, ADA Compliant.
7. Provide trim on exit devices matching locksets.

D. Key locks to Owner's **existing** master-key system.

1. Cylinders with **six**-pin tumblers **and removable cores.**
2. Provide cylinders for **overhead doors,** and other locking doors that do not require other hardware.
3. Provide construction keying.
4. Provide key control system, including cabinet.

E. Closers:

1. Mount closers on interior side (room side) of door opening. Provide regular-arm, parallel-arm, or top-jamb-mounted closers as necessary.
2. Adjustable delayed opening (accessible to people with disabilities) feature on closers.

F. Provide wall stops or floor stops for doors without closers.

G. Provide hardware finishes as follows:

1. Hinges: **Matching finish of lockset/latchset.**
2. Locksets, Latchsets, and Exit Devices: US26D.
3. Closers: **Matching finish of lockset/latchset.**
4. Other Hardware: Matching finish of lockset/latchset.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Mount hardware in locations recommended by the Door and Hardware Institute unless otherwise indicated.

3.2 HARDWARE SCHEDULE

1. Refer to construction documents for hardware schedule information.

END OF SECTION 087100

SECTION 089000 - LOUVERS AND VENTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Provide louvers complying with performance requirements indicated as demonstrated by testing according to AMCA 500-L.

B. Submittals: Product Data, **Shop Drawings.**

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum: ASTM B 221, Alloy 6063-T5 or T-52 for extrusions; ASTM B 209, Alloy 3003 or 5005 for sheet.

B. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 zinc coating.

C. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel.

2.2 LOUVERS

A. Basis of Design: The design for each louver is based on the product named. Comparable products, as determined by Architect, by one of the following manufacturers may be provided:

1. Wind driven rain resistant stationary louver by Ruskin Louvers.

2. Substitutions in accordance with the requirements of the Project Manual

B. **Horizontal**, Extruded-Aluminum, Storm-Resistant Louvers:

1. Aluminum Thickness: 0.060 inch for blades and 0.080 inch for frames.
2. Free Area: Not less than **6.0 sq. ft.** for 48-inch- wide by 48-inch- high louver.
3. Air Performance: Not more than 0.10-inch wg static pressure drop at **600-fpm** free-area velocity.
4. Wind-Driven Rain Performance: Not less than **99** percent effectiveness when subjected to a rain fall rate of **3 inches per hour and a wind speed of 29 mph** at a core area intake velocity of **300 fpm**.

2.3 LOUVER SCREENS

A. Provide screen at interior face of each exterior louver. Fabricate screen frames from same kind and form of metal as indicated for louver to which screens are attached.

1. Screening: **Aluminum**, 1/2-inch- square mesh.

2.4 WALL VENTS (BRICK VENTS)

A. Extruded-aluminum wall vents 0.125 inch thick with aluminum insect screening on inside face of load-bearing construction.

B. Cast-aluminum wall vents with aluminum insect screening on inside face of load-bearing construction.

2.5 FINISHES

A. Aluminum Louvers: Conversion-coated and factory-primed finish, AA-C12C42R1x.

B. Aluminum Louvers: Class I, clear anodic finish; AA-M12C22A41; complying with AAMA 611.

C. Aluminum Louvers: Class I, color anodic finish; AA-M12C22A42/A44; complying with AAMA 611.

D. Aluminum Louvers: Baked-enamel finish, AA-C12C42R1x. Use thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603.

E. Aluminum Louvers: High-performance organic coating finish, AA-C12C42R1x. Use manufacturer's standard 2-coat fluoropolymer system complying with AAMA 2605, with finish coats containing at least 70 percent polyvinylidene fluoride resin by weight.

F. Galvanized Steel Louvers: Factory-primed finish for field painting. Clean and apply conversion coating followed by air-dried primer.

G. Galvanized Steel Louvers: Baked-enamel finish. Use thermosetting, modified-acrylic enamel primer/topcoat system applied over cleaned and conversion-coated metal.

H. Stainless Steel Louvers: No. 4 finish.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install louvers level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible.

C. Protect metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

END OF SECTION 089000

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

B. Fire-Resistance-Rated Assemblies: Provide materials and construction identical to those tested in assemblies per ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

C. STC-Rated Assemblies: Provide materials and construction identical to those tested in assemblies per ASTM E 90 and classified per ASTM E 413 by a qualified independent testing and inspecting agency.

PART 2 - PRODUCTS

2.1 PANEL PRODUCTS

A. Provide in maximum lengths available to minimize end-to-end butt joints.

B. Interior Gypsum Board: ASTM C 36/C 36M or ASTM C 1396/C 1396M, in thickness indicated, with manufacturer's standard edges. **Regular type unless otherwise indicated, Type X where indicated.**

C. Interior Abuse-Resistant Gypsum Soffit Board: ASTM C 36/C 36M or ASTM C 1396/C 1396M, fiber mesh reinforced paperless gypsum wall board panels in thickness indicated, with manufacturer's standard edges. **Regular type unless otherwise indicated, Type X where required for fire-resistance-rated assemblies and where indicated.**

D. Water-Resistant Gypsum Backing Board: ASTM C 630/C 630M or ASTM C 1396/C 1396M, in thickness indicated. **Regular type unless otherwise indicated, Type X where required for fire-resistance-rated assemblies and where indicated.**

E. Glass-Mat, Water-Resistant Gypsum Backing Board: ASTM C 1178/C 1178M, of thickness indicated. **Regular type unless otherwise indicated, Type X where required for fire-resistance-rated assemblies and where indicated].**

1. Product: G-P Gypsum; Dens-Shield Tile Guard.

2. Substitutions in accordance with the requirements of the Project Manual.

F. Cementitious Backer Units: ANSI A118.9.

2.2 ACCESSORIES

A. Trim Accessories: ASTM C 1047, formed from galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet. For exterior trim, use accessories formed from hot-dip galvanized-steel sheet, plastic, or rolled zinc.

1. Provide cornerbead at outside corners unless otherwise indicated.
2. Provide LC-bead (J-bead) at exposed panel edges.
3. Provide control joints where indicated.

B. Aluminum Accessories: Extruded-aluminum accessories indicated with **[manufacturer's standard corrosion-resistant primer]** [**Class II, clear anodic finish; AA-C12C22A31**] [**Class II, color anodic finish; AA-C12C22A32/A34**] [**baked-enamel finish, AA-C12C42R1x**].

C. Joint-Treatment Materials: ASTM C 475/C 475M.

1. Joint Tape: Paper unless otherwise recommended by panel manufacturer.
2. Joint Compounds: **Setting-type compounds. Use setting-type compounds at exterior soffits.**
3. Skim Coat: For final coat of Level 5 finish, use **setting-type, sandable topping compound**.
4. Cementitious Backer Unit Joint-Treatment Materials: Products recommended by cementitious backer unit manufacturer.

D. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant complying with ASTM C 834.

E. Sound-Attenuation Blankets: ASTM C 665, Type I (unfaced).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install gypsum board to comply with ASTM C 840.

1. Isolate gypsum board assemblies from abutting structural and masonry work. Provide edge trim and acoustical sealant.
2. Single-Layer Fastening Methods: Fasten gypsum panels to supports with screws.
3. Multilayer Fastening Methods: Fasten base layers **and face layer separately to supports with screws.**

B. Install cementitious backer units to comply with ANSI A108.11.

C. Fire-Resistance-Rated Assemblies: Comply with requirements of listed assemblies.

D. Finishing Gypsum Board: ASTM C 840.

1. At concealed areas, unless a higher level of finish is required for fire-resistance-rated assemblies, provide Level 1 finish: Embed tape at joints.
2. At substrates for tile, provide Level 2 finish: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges.
3. Unless otherwise indicated, provide Level 4 finish: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges.
4. Where indicated, provide Level 5 finish: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges. Apply skim coat to entire surface.

E. Glass-Mat, Water-Resistant Backing Panels: Finish according to manufacturer's written instructions.

F. Cementitious Backer Units: Finish according to manufacturer's written instructions.

G. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture free of starved spots or other evidence of thin application or of application patterns.

END OF SECTION 092900

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and Samples.

B. Extra Materials: Deliver to Owner at least 10% of each type and color of resilient wall base installed.

PART 2 - PRODUCTS

2.1 WALL BASE

A. **Available** Products:

B. Color and Pattern: To be selected by Architect from the Manufacturer's full range of colors.

C. ASTM F 1861, **Type TV (vinyl).**

D. Group (Manufacturing Method): **I (solid, homogeneous).**

E. Style: **Cove (with top-set toe).**

F. Minimum Thickness: **0.125 inch.**

G. Height: **4 inches.**

H. Lengths: **coils in manufacturer's standard lengths.**

I. Outside Corners: **premolded.**

J. Inside Corners: **premolded.**

2.2 RESILIENT STAIR ACCESSORIES

A. **Available** Products:

B. Color and Pattern: To be selected by Architect from the Manufacturer's full range of colors.

C. Treads: FS RR-T-650, **Composition B (vinyl).**

D. Surface Design: **Type 2 design (designed).**

1. Type 2 Design: **Raised-chevron pattern.**
2. Nosing Style: **Square, adjustable to cover angles between 60 and 90 degrees.**
3. Nosing Height: **1-1/2 inches.**
4. Thickness: **<Insert thickness.>**
5. Size: Lengths and depths to fit each stair tread in one piece.

E. Risers: Smooth, flat, **coved-toe risers, 7 inches high by length matching treads** and of same manufacturer and material as treads.

1. Thickness: **0.080 inch.**

F. Stringers: Of same thickness as risers, height and length after cutting to fit risers and treads and to cover stair stringers, and of same manufacturer and material as treads.

2.3 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement- or blended hydraulic cement-based formulation provided or approved by flooring manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit products and substrate conditions.

C. Stair-Tread-Nose Filler: Two-part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates that do not conform to tread contours.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Prepare concrete substrates according to ASTM F 710. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

B. Adhesively install resilient wall base and accessories.

C. Install wall base in maximum lengths possible. Apply to walls, columns, pilasters, casework, and other permanent fixtures in rooms or areas where base is required.

D. Install stair-tread-nose filler to nosing substrates that do not conform to tread contours.

E. Install reducer strips at edges of floor coverings that would otherwise be exposed.

END OF SECTION 096513

SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and Samples.

B. Fire-Test Response: Resilient tile has critical radiant flux classification of **Class I, not less than 0.45 W/sq. cm** per ASTM E 648.

C. Extra Materials: Deliver to Owner 1 box for every 10 boxes or fraction thereof, of each type and color of resilient floor tile installed.

PART 2 - PRODUCTS

2.1 VINYL COMPOSITION FLOOR TILE

A. Products:

1. Excelon Raffia Stream by Armstrong Flooring Inc.

2. Substitutions in accordance with the requirements of this Project Manual.

B. Color and Pattern: As selected by Architect from manufacturer's full range.

C. ASTM F 1066, **Class 2 (through-pattern tile)**.

D. Wearing Surface: **Smooth.**

E. Thickness: **0.125 inch.**

F. Size: 12 by 12 inches.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement- or blended hydraulic cement-based formulation provided or approved by flooring manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

C. Metal Edge Strips: Extruded aluminum in maximum available lengths to minimize joints.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Prepare concrete substrates according to ASTM F 710. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

B. Lay out tiles so tile widths at opposite edges of room are equal and are at least one-half of a tile.

C. Match tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged. Lay tiles per manufacturer's requirements.

END OF SECTION 096519

SECTION 09 6723

RESINOUS FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes one resinous flooring system, one with urethane body.

1. Application Method: Notched Squeegee.

1.2 SECTION REQUIREMENTS

A. Submittals:
1. Product Data and Samples.
2. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.
3. Maintenance Data: For resinous flooring to include in maintenance manuals.

B. Fire-Test Response: Resilient tile has critical radiant flux classification of Class I, not less than 0.45 W/sq. cm per ASTM E 648.

C. Extra Materials: Deliver to Owner 1 box for every 10 boxes or fraction thereof, of each type and color of resinous flooring installed.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer (applicator) who is experienced in applying resinous flooring systems similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance, and who is acceptable to resinous flooring manufacturer.

B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, through one source from a single manufacturer, with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.

1.4 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 prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects. Store material per product data sheet.

1.5 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 application.

B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.

C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.

D. Concrete substrate shall be properly cured. A vapor barrier must be present for concrete subfloors on or below grade. Otherwise, an osmotic pressure resistant grout must be installed prior to the resinous flooring

1.6 WARRANTY

A. Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of (1) full years from date of installation, or provide a joint and several warranty signed on a single document by material manufacturer and applicator jointly and severally warranting the materials and workmanship for a period of (1) full year from date of installation. A sample warranty letter must be included with bid package or bid may be disqualified.

PART 2 - PRODUCTS

2.1 RESINOUS FLOORING

A. Products:

1. Stonhard, Inc.; Stongard® MR or approved equal.

B. Color and Pattern: as selected by Architect from Manufactures Standards.

C. Wearing Surface: Texture as selected by Architect.

D. Integral Cove Base: 4 inches.

E. Overall System Thickness: 40 mils.

F. System Components: Manufacturer's standard components that are compatible with each other and as follows:

1. Primer Coat:

a. Material Basis: Stonhard Standard Primer.
b. Resin: (2) two component epoxy.
c. Application Method: squeegee back roll.
d. Number of Coats: One.

2. Primer Coat 2:

a. Material Basis: Stonhard SL Primer.
b. Resin: (3) three component epoxy, with 90 grit silica.
c. Application Method: squeegee back roll onto wet standard primer.
d. Number of Coats: One.

3. Body Coat(s):

a. Material Basis: Stonproof ME7
b. Resin: Urethane Membrane.
c. Application Method: Notched trowel screed.
d. Number of Coats: One.

4. Topcoat: Stonkote GS4, general service sealing.

a. Material Basis: Stonkote GS4
b. Resin: Epoxy.
c. Type: pigmented.
d. Finish: standard.
e. Number of Coats: one.

G. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:

1. Elongation: 200% per ASTM D 412.
2. Tensile Strength: 1,200 psi per ASTM D 412.
3. Hardness: 70, Shore D per ASTM D 2240.
4. Abrasion Resistance: 0.06 gm per ASTM D-4060, CS-17
5. Water Absorption : 0.1% per ASTM C-413

2.2 ACCESSORY MATERIALS

A. Patching, Leveling and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.

B. Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated. Allowances should be included for Stonflex MP7 joint fill material.

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean and dry 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. Mechanically prepare substrates as follows:

2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.
3. Meet the following requirements.

    a. Keep in situ probe test, ASTM F 2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 80 percent.
    b. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. of slab in 24 hours.
    c. Perform additional moisture tests recommended by manufacturer. Proceed with application only after substrates pass testing.

C. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

D. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations. Allowances should be included for Stonflex MP7 joint fill material, and CT5 concrete crack treatment.

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 where required by resinous system, over prepared substrate at manufacturer's recommended spreading rate.

C. Membrane Base: Mix and apply membrane base over fully cured primer using manufacturer's specially designed squeegees and rollers

D. Apply topcoat(s) in number of coats indicated for flooring system and at spreading rates recommended in writing by manufacturer.

3.3 TERMINATIONS

A. Chase edges to "lock" the coating system into the concrete substrate along lines of termination.

B. Penetration Treatment: Lap and seal coating onto the perimeter of the penetrating item by bridging over compatible elastomer at the interface to compensate for possible movement.

C. Trenches: Continue coating system into trenches to maintain monolithic protection. Treat cold joints to assure bridging of potential cracks.

D. Treat floor drains by chasing the coating to lock in place at point of termination.

3.4 JOINTS AND CRACKS

A. Treat control joints to bridge potential cracks and to maintain monolithic protection.

B. Treat cold joints and construction joints and to maintain monolithic protection on horizontal and vertical surfaces as well as horizontal and vertical interfaces.

C. Vertical and horizontal contraction and expansion joints are treated by installing backer rod and compatible sealant after coating installation is completed. Provide sealant type recommended by manufacturer for traffic conditions and chemical exposures to be encountered.

3.5 FIELD QUALITY CONTROL

A. Material Sampling: Owner may at any time and any numbers of times during resinous flooring application require material samples for testing for compliance with requirements.

1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

3.6 CLEANING, PROTECTING, AND CURING

A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 24 hours.

B. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection and cleaning of surfaces after final coats.

C. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer. General contractor is responsible for cleaning prior to inspection.

END OF SECTION 09 6723

SANITARY WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Prefinished sanitary wall panels.
2. Trim.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 07 9200 - Joint Sealers.

1.2 REFERENCES

A. ASTM International (ASTM) E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS

A. Submittals for Review:
1. Samples:
a. 6 x 6 inch panel samples showing available colors.

B. Quality Control Submittals:
1. Certificates of Compliance: Certification from an independent testing laboratory that panels meet fire hazard classification requirements.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 5 years experience in work of this Section.

1.5 PROJECT CONDITIONS

A. Do not install products if temperature, humidity, and ventilation requirements are outside limits recommended by manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Crane Composites. (www.cranecomposites.com)
2. Nudo Products, Inc. (www.nudo.com)
3. Marlite. (www.marlite.com)
4. Panolam Industries International, Inc. (www.panolam.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Sanitary Wall Panels:

1. Type: Glass fiber reinforced plastic, USDA approved for incidental food contact.
2. Size: 3/32 inch thick x 48 inches wide x maximum practical length.
3. Color: To be selected from manufacturer's full color range.
4. Surface texture: pebbled

2.3 ACCESSORIES

A. Trim:
1. One piece extruded PVC, manufacturer's standard profile.
2. Inside and outside corners, division bar, and J-molding.

B. Adhesive:
1. Compatible with panels and substrate; recommended by panel manufacturer.

C. Joint Sealer: Specified in Section 07 9200.

D. Patching Compound: White latex type.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare substrate to receive panels:
1. Remove high spots.
2. Fill low spots with patching compound; sand smooth.
3. Remove loose and foreign matter that could impair adhesion.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install trim:
1. Panel-to-panel joints: Division bar.
2. Internal and external corners.
3. Exposed edges: J molding.
4. Secure to substrate.

C. Cut panels to fit at perimeter and around penetrations. Ensure that trim will completely cover cut edges.

D. Maintain 1/8 inch expansion space at perimeter and around penetrations.

E. Adhere panels to substrate with continuous beads of adhesive.

F. Install continuous bead of joint sealer between panels and trim and between trim and adjacent construction.

END OF SECTION 09 7733

SECTION 099100 - PAINTING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Summary: Paint exposed surfaces unless otherwise indicated.

1. Paint the back side of access panels.
2. Color-code mechanical piping in accessible ceiling spaces.
3. Do not paint prefinished items, items with an integral finish, operating parts, and labels unless otherwise indicated.

B. Submittals:

1. Product Data. **Include printout of "MPI Approved Products List" with product highlighted.**
2. Samples.

C. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

D. Mockups: Full-coat finish Sample of each type of coating, color, and substrate, applied where directed.

E. Extra Materials: Deliver to Owner **1 gal.** of each color and type of finish coat paint used on Project, in containers, properly labeled and sealed.

PART 2 - PRODUCTS

2.1 PAINT

A. Products:

1. Interior Acrylic Masonry Primer and Sealer for all Interior masonry conditions:
   a. Zolatone SP97 Bonding Primer by Zolatone Interior Finishes
   b. Substitutions in accordance with the requirements of this Project Manual.
2. Interior Acrylic Paint for all Interior masonry conditions:
   a. Zolatone Counterpointe Pearlstone and Sandstone Wall Finish by Zolatone Interior Finishes
   b. Substitutions in accordance with the requirements of this Project Manual.

3. Interior Latex Primer and Sealer for all Interior conditions:
   a. ProMar 400 Zero VOC Acrylic Latex Primer by Sherwin-Williams Company.
   b. Substitutions in accordance with the requirements of this Project Manual.
4. Interior Latex Paint for all Interior conditions:
   a. ProMar 400 Zero VOC Acrylic Latex by Sherwin-Williams Company.
   b. Substitutions in accordance with the requirements of this Project Manual.
5. Exterior Acrylic Masonry Primer and Sealer for all Exterior masonry conditions:
   a. Loxon Concrete & Masonry Primer/Sealer by Sherwin-Williams Company
   b. Substitutions in accordance with the requirements of this Project Manual.
6. Exterior Acrylic Paint for all Exterior masonry conditions:
   a. Conflex Sherlastic Elastomeric Coating by Sherwin-Williams Company
   b. Substitutions in accordance with the requirements of this Project Manual.

B. Material Compatibility: Provide materials that are compatible with one another and with substrates.

1. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove hardware, lighting fixtures, and similar items that are not to be painted. Mask items that cannot be removed. Reinstall items in each area after painting is complete.

B. Clean and prepare surfaces in an area before beginning painting in that area. Schedule painting so cleaning operations will not damage newly painted surfaces.

3.2 APPLICATION

A. Apply paints according to manufacturer's written instructions.

1. Use brushes only for exterior painting and where the use of other applicators is not practical.
2. Use rollers for finish coat on interior walls and ceilings.

B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

1. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

C. Apply stains and transparent finishes to produce surface films without color irregularity, cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other imperfections. Use multiple coats to produce a smooth surface film of even luster.

3.3 EXTERIOR PAINT APPLICATION SCHEDULE

A. Concrete Masonry Units:

1. **Semigloss** Elastomeric: **Two coats** over alkali-resistant primer: MPI EXT 4.2L.

B. Steel:

1. **Semigloss,** Quick-Dry Enamel: **Two coats** over rust-inhibitive primer: MPI EXT 5.1A.

C. Galvanized Metal:

1. **Semigloss** Latex: **Two coats** over waterborne galvanized-metal primer: MPI EXT 5.3H.

Aluminum:

2. **Semigloss** Latex: **Two coats** over quick-drying primer for aluminum: MPI EXT 5.4H.

D. Dressed Lumber: Including **architectural woodwork.**

1. **Semigloss** Latex: **Two coats** over primer: MPI EXT 6.3L.

E. Wood Panel Products: Including **fascias & trim.**

1. **Semigloss** Latex: **Two coats** over primer: MPI EXT 6.4K.

F. Plastic Trim:

1. **Semigloss** Latex: **Two coats** over **water-based** bonding primer: MPI EXT 6.8A.

3.4 INTERIOR PAINT APPLICATION SCHEDULE

A. Concrete Masonry Units:

1. **Eggshell** Acrylic: **Two coats** over latex block filler: MPI INT 4.2A.

B. Steel:

1. **Semigloss,** Quick-Dry Enamel: **Two coats** over quick-drying alkyd metal primer: MPI INT 5.1A.

C. Aluminum:

1. **Semigloss** Latex: **Two coats** over quick-drying primer for aluminum: MPI INT 5.4H.

D. Dressed Lumber: Including **architectural woodwork.**

1. **Semigloss** Latex: **Two coats** over primer: MPI INT 6.3T.

E. Wood Panel-Products:

1. **Semigloss,** Waterborne Acrylic: **Three** coats over stain: MPI INT 6.4U.

F. Gypsum Board:

1. **Eggshell** Latex: **Two coats** over primer/sealer: MPI INT 9.2A.

G. Gypsum Board (Ceilings):

1. **Flat** Latex: **Two coats** over primer/sealer: MPI INT 9.2A.

END OF SECTION 099100

SECTION 101400 - SIGNAGE

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data, Shop Drawings, and Samples.

1. Submit full-size rubbings for metal plaques.

B. Regulatory Requirements: Comply with applicable provisions in **the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.**

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), Type UVA (UV absorbing).

B. Plastic Laminate: High-pressure laminate engraving stock with face and core in contrasting colors.

C. Applied Vinyl: Die-cut characters from vinyl film of nominal thickness of 3 mils with pressure-sensitive adhesive backing, suitable for exterior applications.

2.2 SIGNS

A. Interior Panel Signs: **Engraved plastic laminate** with **square-cut** edges and **rounded** corners.

1. Finishes and Colors: As selected by Architect from the manufacturer's full range.
2. Tactile Characters: Characters and Grade 2 Braille raised 1/32 inch above surface with contrasting colors.
3. Provide signs for **all** rooms mounted on the **wall beside the room door.**

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate signs where indicated or directed by Architect. Install signs level, plumb, and at heights indicated, with sign surfaces free from distortion and other defects in appearance.

B. Wall-Mounted Signs:

1. Two-Face Tape: Mount signs to smooth, nonporous surfaces, other than vinyl.
2. Hook-and-Loop Tapes: Mount signs to smooth, nonporous surfaces.
3. Magnetic Tape: Mount signs to smooth, nonporous surfaces.
4. Silicone-Adhesive Mounting: Attach signs to irregular, porous, or vinyl-covered surfaces.
5. Mechanical Fasteners: Use nonremovable mechanical fasteners placed through predrilled holes.

END OF SECTION 101400

SECTION 102113 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data, Shop Drawings, and Samples.

PART 2 - PRODUCTS

2.1 TOILET COMPARTMENTS AND SCREENS

A. Products:

1. Santana
2. Substitutions in accordance with the requirements of this Project Manual.

2.2 MATERIALS

A. Panel, Pilaster, and Door Material:
1. Solid-Plastic, Polymer Resin: High-density polyethylene with homogenous color, not less than 1 inch thick, with seamless construction and eased edges.
2. Color: As selected by Architect from the manufacturer's full range.

B. Pilaster Shoes and Sleeves (Caps): **Stainless steel,** not less than 4 inches high.

C. Brackets: **Continuous.**

1. Material: **Stainless steel.**

2.3 FABRICATION

A. Toilet Compartments: **Overhead braced and floor anchored.**

B. Urinal Screens: **Floor and ceiling anchored.**

C. Metal Units: Internally reinforce metal panels for hardware, accessories, and grab bars.

D. Solid-Plastic, Polymer-Resin Units: Provide aluminum heat-sink strips at exposed bottom edges of panels and doors.

E. Doors: Unless otherwise indicated, 24-inch-wide in-swinging doors for standard toilet compartments and 36-inch-wide out-swinging doors with a minimum 32-inch-wide clear opening for compartments indicated to be accessible to people with disabilities.

F. Door Hardware: **Stainless steel**. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be accessible to people with disabilities.

1. Hinges: Self-closing type, adjustable to hold door open at any angle up to 90 degrees.
2. Latches and Keepers: **Recessed** unit designed for emergency access and with combination rubber-faced door strike and keeper.
3. Coat Hook: Combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
4. Door Bumper: Rubber-tipped bumpers at out-swinging doors or entrance screen doors.
5. Door Pull: Provide at out-swinging doors. Provide units on both sides of doors at compartments indicated to be accessible to people with disabilities.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units rigid, straight, level, and plumb, with not more than 1/2 inch between pilasters and panels and not more than 1 inch between panels and walls. Provide brackets, pilaster shoes, bracing, and other components required for a complete installation. Use theft-resistant exposed fasteners finished to match hardware. Use sleeve nuts for through-bolt applications.

1. Stirrup Brackets: Align brackets at pilasters with brackets at walls.
2. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors and swing doors in entrance screens to return to fully closed position.

END OF SECTION 102113

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, No. 4 finish (satin), 0.0312-inch minimum nominal thickness unless otherwise indicated.

B. Brass: ASTM B 19, ASTM B 16, or ASTM B 30.

C. Aluminum: ASTM B 221, Alloy 6063-T6 or 6463-T6.

D. Sheet Steel: ASTM A 1008/A 1008M, 0.0359-inch minimum nominal thickness.

E. Galvanized-Steel Sheet: ASTM A 653/A 653M, G60.

F. Chromium Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

G. Baked-Enamel Finish: Factory-applied, gloss-white, baked-acrylic-enamel coating.

H. Tempered Glass: ASTM C 1048, Kind FT (fully tempered).

I. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

J. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

K. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

L. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of **six** keys to Owner's representative.

2.2 TOILET AND BATH ACCESSORIES

A. Manufacturers:

1. Bobrick Washroom Equipment, Inc.

2. Substitutions in accordance with the requirements of the Project Manual.

B. Refer to construction documents for scheduled accessory information.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

1. Install grab bars to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

B. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items. Remove temporary labels and protective coatings.

END OF SECTION 102800

SECTION 220500 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Summary: General requirements for motors, hangers and supports, vibration isolation and seismic restraints, and meters and gages.

B. Submittals: Product Data for materials and equipment specified in this Section.

PART 2 - PRODUCTS

2.1 MOTORS

A. Motor Characteristics:

1. Motors 1/2 HP and Larger: Three phase.
2. Motors Smaller Than 1/2 HP: Single phase.
3. Frequency Rating: 60 Hz.
4. Voltage Rating: NEMA standard voltage selected to operate on nominal circuit voltage to which motor is connected.
5. Service Factor: 1.15 for open dripproof motors; 1.0 for totally enclosed motors.
6. Duty: Continuous duty at ambient temperature of 105 deg F and at altitude of 3300 feet above sea level.
7. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
8. Enclosure: Unless otherwise indicated, open dripproof.
9. Motors Used with Variable-Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.

2.2 HANGERS AND SUPPORTS

A. Hanger and Pipe Attachments: Factory fabricated with galvanized coatings; nonmetallic coated for hangers in direct contact with copper tubing.

B. Building Attachments: Powder-actuated-type, drive-pin attachments with pullout and shear capacities appropriate for supported loads and building materials.

C. Mechanical-Expansion Anchors: Insert wedge-type attachments with pullout and shear capacities appropriate for supported loads and building materials.

2.3 VIBRATION ISOLATION AND SEISMIC CONTROL DEVICES

A. Vibration Supports:

1. Pads: Arranged in single or multiple layers of oil- and water-resistant **hermetically sealed compressed fiberglass** of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match requirements of supported equipment.
2. Mounts : Double-deflection type, with molded, oil-resistant fiberglass, rubber or neoprene isolator elements with factory-drilled, encapsulated top plate for bolting to equipment and baseplate for bolting to structure. Provide isolator with minimum **0.5-inch** static deflection.
3. Spring Isolators : Freestanding, laterally stable, **open**-spring isolators. Provide isolator with minimum **1-inch** static deflection.

B. Vibration Hangers:

1. Elastomeric Hangers : Double-deflection type, with molded, oil-resistant rubber or neoprene isolator elements bonded to steel housings with threaded connections for hanger rods. Provide isolator with minimum **0.5-inch** static deflection.
2. Spring Hangers : Combination coil-spring and elastomeric-insert hanger with spring and insert in compression. Provide isolator with minimum **1-inch** static deflection.

C. Seismic Restraints:

1. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.
2. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.
3. Restraining Cables: **[Galvanized]** [**Stainless**]-steel cables with end connections made of steel assemblies that swivel to final installation angle and utilize two clamping bolts for cable engagement.
4. Mechanical Anchor Bolts: Seismic-rated, drill-in, and stud-wedge or female-wedge type. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.
5. Adhesive Anchor Bolts: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

2.4 PRESSURE GAGES AND TEST PLUGS

A. Pressure Gages: Direct-mounting, indicating-dial type complying with ASME B40.100. Dry metal case, minimum 2-1/2-inch diameter with red pointer on white face, and plastic window. Minimum accuracy 3 percent of middle half of range. Range two times operating pressure.

B. Test Plug: Corrosion-resistant brass or stainless-steel body with two self-sealing rubber core inserts and gasketed and threaded cap, with extended stem for units to be installed in insulated piping. Minimum pressure and temperature rating 500 psig at 200 deg F.

PART 3 - EXECUTION

3.1 MOTOR INSTALLATION

A. Anchor motor assembly to base, adjustable rails, or other support, arranged and sized according to manufacturer's written instructions.

3.2 GENERAL PIPING INSTALLATIONS

A. Install piping free of sags and bends.

B. Install fittings for changes in direction and branch connections.

C. Install sleeves for pipes passing through **masonry** walls, **gypsum board partitions,** and concrete floor and roof slabs.

D. Exterior Wall, Pipe Penetrations: Mechanical sleeve seals installed in steel or cast-iron pipes for wall sleeves.

E. Comply with requirements in Division 07 Section "Penetration Firestopping" for sealing pipe penetrations in fire-rated construction.

F. Install unions at final connection to each piece of equipment.

G. Install dielectric unions and flanges to connect piping materials of dissimilar metals in gas piping.

H. Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals in water piping.

3.3 GENERAL EQUIPMENT INSTALLATIONS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components, unless otherwise indicated.

C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.4 CONCRETE BASES

A. Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.

B. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.

C. Install dowel rods on 18-inch centers around the full perimeter of the base to connect concrete base to concrete floor.

D. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.

E. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

F. Install anchor bolts to elevations required for proper attachment to supported equipment.

G. Use **4000-psi,** 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section "Cast-in-Place Concrete."

3.5 HANGERS AND SUPPORTS

A. Comply with MSS SP-69 and MSS SP-89. Install building attachments within concrete or to structural steel.

B. Install hangers and supports to allow controlled thermal and seismic movement of piping systems.

C. Install powder-actuated drive-pin fasteners in concrete after concrete is cured. Do not use in lightweight concrete or in slabs less than 4 inches thick.

D. Install mechanical-expansion anchors in concrete after concrete is cured. Do not use in lightweight concrete or in slabs less than 4 inches thick.

E. See Division 21 Section "Water-Based Fire-Suppression Systems" for support of fire-protection system piping.

F. Load Distribution: Install hangers and supports so piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

G. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Adjustable Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
2. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.

3. Adjustable Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
4. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
5. Adjustable Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS.

H. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.

3.6 VIBRATION ISOLATION AND SEISMIC CONTROL DEVICE INSTALLATION

A. Adjust vibration isolators to allow free movement of equipment limited by restraints.

B. Install resilient bolt isolation washers and bushings on equipment anchor bolts.

C. Install cables so they do not bend across sharp edges of adjacent equipment or building structure.

END OF SECTION 220500

SECTION 230500 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Summary: General requirements for motors, hangers and supports, vibration isolation and seismic restraints, and meters and gages.

B. Submittals: Product Data for materials and equipment specified in this Section.

PART 2 - PRODUCTS

2.1 MOTORS

A. Motor Characteristics:

1. Motors **1/2** HP and Larger: Three phase.
2. Motors Smaller Than **1/2** HP: Single phase.
3. Frequency Rating: 60 Hz.
4. Voltage Rating: NEMA standard voltage selected to operate on nominal circuit voltage to which motor is connected.
5. Service Factor: 1.15 for open dripproof motors; 1.0 for totally enclosed motors.
6. Duty: Continuous duty at ambient temperature of 105 deg F and at altitude of 3300 feet above sea level.
7. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
8. Enclosure: Unless otherwise indicated, open dripproof.
9. Motors Used with Variable-Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.

2.2 HANGERS AND SUPPORTS

A. Hanger and Pipe Attachments: Factory fabricated with galvanized coatings; nonmetallic coated for hangers in direct contact with copper tubing.

B. Building Attachments: Powder-actuated-type, drive-pin attachments with pullout and shear capacities appropriate for supported loads and building materials.

C. Mechanical-Expansion Anchors: Insert wedge-type attachments with pullout and shear capacities appropriate for supported loads and building materials.

2.3 VIBRATION ISOLATION AND SEISMIC CONTROL DEVICES

A. Vibration Supports:

1. Pads : Arranged in single or multiple layers of oil- and water-resistant **hermetically sealed compressed fiberglass** of sufficient stiffness for uniform loading over pad area, molded with a nonslip pattern and galvanized-steel baseplates, and factory cut to sizes that match requirements of supported equipment.
2. Mounts: Double-deflection type, with molded, oil-resistant fiberglass, rubber or neoprene isolator elements with factory-drilled, encapsulated top plate for bolting to equipment and baseplate for bolting to structure. Provide isolator with minimum [**0.5-inch** static deflection.
3. Spring Isolators : Freestanding, laterally stable, **open**-spring isolators. Provide isolator with minimum **1-inch** static deflection.

B. Vibration Hangers:

1. Elastomeric Hangers: Double-deflection type, with molded, oil-resistant rubber or neoprene isolator elements bonded to steel housings with threaded connections for hanger rods. Provide isolator with minimum **0.5-inch** static deflection.
2. Spring Hangers: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression. Provide isolator with minimum **1-inch** static deflection.

C. Seismic Restraints:

1. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.
2. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.
3. Restraining Cables: **Galvanized**-steel cables with end connections made of steel assemblies that swivel to final installation angle and utilize two clamping bolts for cable engagement.
4. Mechanical Anchor Bolts: Seismic-rated, drill-in, and stud-wedge or female-wedge type. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.
5. Adhesive Anchor Bolts: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

2.4 PRESSURE GAGES AND TEST PLUGS

A. Pressure Gages: Direct-mounting, indicating-dial type complying with ASME B40.100. Dry metal case, minimum 2-1/2-inch diameter with red pointer on white face, and plastic window. Minimum accuracy 3 percent of middle half of range. Range two times operating pressure.

B. Test Plug: Corrosion-resistant brass or stainless-steel body with two self-sealing rubber core inserts and gasketed and threaded cap, with extended stem for units to be installed in insulated piping. Minimum pressure and temperature rating 500 psig at 200 deg F.

PART 3 - EXECUTION

3.1 MOTOR INSTALLATION

A. Anchor motor assembly to base, adjustable rails, or other support, arranged and sized according to manufacturer's written instructions.

3.2 GENERAL PIPING INSTALLATIONS

A. Install piping free of sags and bends.

B. Install fittings for changes in direction and branch connections.

C. Install sleeves for pipes passing through **masonry** walls, **gypsum board partitions,** and concrete floor and roof slabs.

D. Exterior Wall, Pipe Penetrations: Mechanical sleeve seals installed in steel or cast-iron pipes for wall sleeves.

E. Comply with requirements in Division 07 Section "Penetration Firestopping" for sealing pipe penetrations in fire-rated construction.

F. Install unions at final connection to each piece of equipment.

G. Install dielectric unions and flanges to connect piping materials of dissimilar metals in gas piping.

H. Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals in water piping.

3.3 GENERAL EQUIPMENT INSTALLATIONS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components, unless otherwise indicated.

C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.4 CONCRETE BASES

A. Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.

B. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.

C. Install dowel rods on 18-inch centers around the full perimeter of the base to connect concrete base to concrete floor.

D. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.

E. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

F. Install anchor bolts to elevations required for proper attachment to supported equipment.

G. Use **4000-psi**, 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section "Cast-in-Place Concrete."

3.5 HANGERS AND SUPPORTS

A. Comply with MSS SP-69 and MSS SP-89. Install building attachments within concrete or to structural steel.

B. Install hangers and supports to allow controlled thermal and seismic movement of piping systems.

C. Install powder-actuated drive-pin fasteners in concrete after concrete is cured. Do not use in lightweight concrete or in slabs less than 4 inches thick.

D. Install mechanical-expansion anchors in concrete after concrete is cured. Do not use in lightweight concrete or in slabs less than 4 inches thick.

E. Comply with requirements in Division 07 Section "Penetration Firestopping" for sealing pipe penetrations in fire-rated construction.

F. Load Distribution: Install hangers and supports so piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

G. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Adjustable Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
2. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.

3. Adjustable Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
4. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
5. Adjustable Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2.

H. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.

3.6 VIBRATION ISOLATION AND SEISMIC CONTROL DEVICE INSTALLATION

A. Adjust vibration isolators to allow free movement of equipment limited by restraints.

B. Install resilient bolt isolation washers and bushings on equipment anchor bolts.

C. Install cables so they do not bend across sharp edges of adjacent equipment or building structure.

END OF SECTION 230500

SECTION 260500 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Structural Performance: Design, engineer, fabricate, and install hangers and supports to withstand structural loads specified in "Project Conditions" Paragraph below.

B. Submittals:

1. Product Data: For sleeve seals.
2. Shop Drawings: For **hangers and supports** including attachments to the structure, identify hardware and indicate analyses, forces, strengths, materials, and dimensions; signed and sealed by a qualified professional engineer. Professional engineer qualification requirements are specified in Division 01 Section "Quality Requirements."

C. Project Conditions:

1. Site Class as Defined in the IBC: **B.**
2. Assigned Seismic Use Group or Building Category as Defined in the IBC: **I.**

PART 2 - PRODUCTS

2.1 RACEWAYS

A. Raceways:

1. EMT: ANSI C80.3, zinc-coated steel, with set-screw or compression fittings.
2. ENT: NEMA TC 13, complying with UL 1653.
3. FMC: Zinc-coated steel.
4. IMC: ANSI C80.6, zinc-coated steel, with threaded fittings.
5. LFMC: Zinc-coated, flexible steel with sunlight-resistant and mineral-oil-resistant plastic jacket.
6. RNC: NEMA TC 2, **Type EPC-40-PVC,** with NEMA TC3 fittings.
7. Raceway Fittings: Specifically designed for raceway type used in Project.

B. Wireways: Sheet metal sized and shaped, with **screw** covers.

C. Surface Raceways:

1. Metal: Galvanized steel with snap-on covers. **Manufacturer's standard enamel finish in color selected by Architect.**
2. Plastic: PVC, extruded and fabricated to size and shape indicated, with snap-on cover and mechanically coupled connections with plastic fasteners.

D. Floor Boxes: **Cast metal semiadjustable,** rectangular.

2.2 CONDUCTORS AND CABLES

A. Conductors:

1. Conductors, No. 10 AWG and Smaller: Solid or stranded copper.
2. Conductors, Larger Than No. 10 AWG: Stranded copper.
3. Insulation: Thermoplastic, rated at 75 deg C minimum.
4. Wire Connectors and Splices: Units of size, ampacity rating, material, type, and class suitable for service indicated.

B. Cable Type NM-B **and NMC-B** Cable: Comply with UL 719 with Type THHN/THWN conductors complying with UL 83.

C. Cable Type SEU: Comply with UL 854 with Type THHN/THWN conductors complying with UL 83[**or Type XHHW-2 complying with UL 44**].

D. Cable Type UF-B: Comply with UL 493 with Type THHN/THWN conductors complying with UL 83.

2.3 GROUNDING MATERIALS

A. Conductors: Solid for No. 8 AWG and smaller, and stranded for No. 6 AWG and larger unless otherwise indicated.

1. Insulated Conductors: **Copper** wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
2. Bare, Solid-Copper Conductors: Comply with ASTM B 3.
3. Bare, Stranded-Copper Conductors: Comply with ASTM B 8.

B. Ground Rods: Copper-clad steel, sectional type; 5/8 by 96 inches in diameter.

C. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts with clamp-type pipe connectors sized for pipe.

D. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.4 ELECTRICAL IDENTIFICATION MATERIALS

A. Raceway Identification Materials: **Snap-around, color-coding bands; flexible, preprinted, color-coded acrylic.**

B. Conductor Identification Materials: Color-Coding Conductor Tape: Self-adhesive vinyl tape 1 to 2 inches wide.

C. Underground-Line Warning Tape: Permanent, bright-colored, continuous-printed, polyethylene tape with continuous metallic strip or core.

D. Tape Markers for Wire: Vinyl or vinyl-cloth, self-adhesive, wraparound type with circuit identification legend machine printed by thermal transfer or equivalent process.

E. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

F. Metal-Backed, Butyrate Warning Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.

G. Equipment Identification Labels: Engraved, laminated acrylic or melamine label; punched or drilled for screw mounting. White letters on a dark-gray background; red letters for emergency systems.

H. Fasteners: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

2.5 SUPPORT AND ANCHORAGE COMPONENTS

A. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed under this Project, with a minimum structural safety factor of **five** times the applied force.

B. Steel Slotted Support Systems: Comply with MFMA-3, factory-fabricated components for field assembly, and provide finish suitable for the environment in which installed.

1. Channel Dimensions: Selected for structural loading **and applicable seismic forces.**

C. Raceway and Cable Supports: As described in NECA 1.

D. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and fittings.

E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded malleable-iron body and insulating wedging.

F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

G. Mounting, Anchoring, and Attachment Components:

1. Powder-Actuated Fasteners: Threaded-steel stud.
2. Mechanical-Expansion Anchors: Insert-wedge-type, **zinc-coated** steel, for use in hardened portland cement concrete.
3. Concrete Inserts: Steel or malleable-iron, slotted-support-system units similar to MSS Type 18; complying with MFMA-3 or MSS SP-58.

4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, high strength; complying with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

2.6 SEISMIC-RESTRAINT COMPONENTS

A. Rated Strength, Features, and Application Requirements for Restraint Components: As defined in reports by **an evaluation service member of the ICC Evaluation Service Program.**

1. Structural Safety Factor: Strength in tension, shear, and pullout force of components used shall be at least **five** times the maximum seismic forces to which they will be subjected.

B. Angle and Channel-Type Brace Assemblies: Steel angles or steel slotted-support-system components; with accessories for attachment to braced component at one end and to building structure at the other end.

C. Cable Restraints: ASTM A 603, zinc-coated, steel wire rope attached to steel or stainless-steel thimbles, brackets, swivels, and bolts designed for restraining cable service.

1. Seismic Mountings, Anchors, and Attachments: Devices as specified in "Support and Anchorage Components" Article, selected to resist seismic forces.
2. Hanger Rod Stiffener: **Steel tube or steel slotted-support-system sleeve with internally bolted connections** to hanger rod, of design recognized by **an evaluation service member of the ICC Evaluation Program.**
3. Bushings for Floor-Mounted Equipment Anchors: Neoprene units designed for seismically rated rigid equipment mountings, and matched to type and size of anchor bolts and studs used.
4. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for seismically rated rigid equipment mountings, and matched to type and size of attachment devices used.

2.7 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized-steel sheet.

D. Sleeve Seals: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Sealing Elements: **EPDM** interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
2. Pressure Plates: **Plastic**. Include two for each sealing element.
3. Connecting Bolts and Nuts: **Carbon steel with corrosion-resistant coating** of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.8 GROUT

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

PART 3 - EXECUTION

3.1 GENERAL ELECTRICAL EQUIPMENT INSTALLATION REQUIREMENTS

A. Install electrical equipment to allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.

B. Install electrical equipment to provide for ease of disconnecting the equipment with minimum interference to other installations.

C. Install electrical equipment to allow right of way for piping and conduit installed at required slope.

D. Install electrical equipment to ensure that connecting raceways, cables, wireways, cable trays, and busways are clear of obstructions and of the working and access space of other equipment.

E. Install required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

F. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Comply with requirements in Division 08 Section "Access Doors and Frames."

G. Install sleeve and sleeve seals of type and number required for sealing electrical service penetrations of exterior walls.

H. Comply with NECA 1.

3.2 RACEWAY AND CABLE INSTALLATION

A. Outdoor Raceways Applications:

1. Exposed or Concealed: IMC.
2. Underground, Single Run: RNC.

3. Connection to Vibrating Equipment: LFMC.
4. Boxes and Enclosures: Metallic, NEMA 250, Type 3R or Type 4.

B. Indoor Raceways Applications:

1. Exposed or Concealed: EMT.
2. Connection to Vibrating Equipment: FMC; in wet or damp locations, use LFMC.
3. Damp or Wet Locations: IMC.
4. Boxes and Enclosures: Metallic, NEMA 250, Type 1, unless otherwise indicated.

C. Conceal raceways and cables, unless otherwise indicated, within finished walls, ceilings, and floors.

D. Install raceways and cables at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Locate horizontal raceway runs above water and steam piping.

E. Install raceways embedded in slabs in middle third of slab thickness where practical, and leave at least 1-inch- thick concrete cover.

1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
2. Space raceways laterally to prevent voids in concrete.
3. Install conduit larger than 1-inch trade size, parallel to or at right angles to main reinforcement. Where conduit is at right angles to reinforcement, place conduit close to slab support.
4. Transition from nonmetallic tubing to Schedule 80 nonmetallic conduit, rigid steel conduit, or IMC before rising above floor.

F. Raceways Embedded in Slabs:

1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.

G. Install pull wires in empty raceways.

H. Connect motors and equipment subject to vibration, noise transmission, or movement with a 72-inch maximum length of flexible conduit.

I. Install raceways and cables conceal within finished walls, ceilings, and floors unless otherwise indicated.

J. Install raceways and cables at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Locate horizontal raceway runs above water and steam piping.

3.3 WIRING METHODS

A. Service Entrance: **Type THHN-THWN, single conductors in raceway**

B. Exposed Feeders, Branch Circuits, and Class 1 Control Circuits, Including in Crawlspaces: **Type THHN-THWN, single conductors in raceway.**

C. Feeders and Branch Circuits Concealed in Ceilings, Walls, Partitions, and Crawlspaces: **Type THHN-THWN, single conductors in raceway.**

D. Feeders and Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and underground: **Type THHN-THWN, single conductors in raceway.**

E. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, and strain relief device at terminations to suit application.

F. Class 2 Control Circuits: **Type THHN-THWN, in raceway.**

3.4 GROUNDING

A. Underground Grounding Conductors: Install bare copper conductor, No. **2/0** AWG minimum. Bury at least 24 inches below grade.

B. Pipe and Equipment Grounding Conductor Terminations: Bolted.

C. Underground Connections: Welded.

D. Connections to Structural Steel: **Welded.**

E. Install grounding conductors routed along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

F. Install ground rods driven into ground until tops are 2 inches below finished floor or final grade unless otherwise indicated.

G. Make connections without exposing steel or damaging coating, if any.

H. Install bonding straps and jumpers in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

I. Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.

J. Bond to equipment mounted on vibration isolation hangers and supports so vibration is not transmitted to rigidly mounted equipment.

K. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service

entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

L. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells.

1. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
2. Perform tests by fall-of-potential method according to IEEE 81.
3. Report measured ground resistances that exceed the following values:

   a. Power and Lighting Equipment or System with Capacity 500 kVA and Less: **10** ohms.
   b. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: **5** ohms.
   c. Power Distribution Units or Panelboards Serving Electronic Equipment: **1** ohm(s).

4. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

3.5 IDENTIFICATION

A. Accessible Raceways and Cables of Auxiliary Systems: Identify the following systems with color-coded, **snap-around, color-coding bands**:

1. Fire Alarm System: Red.
2. Security System: Blue and yellow.
3. Telecommunication System: Green and yellow.

B. Power-Circuit Conductor Identification: For No. 3 AWG conductors and larger, at each location where observable, identify phase using color-coding conductor tape.

C. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring.

D. Warning Labels for Enclosures for Power and Lighting: Comply with 29 CFR 1910.145; identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.

E. Equipment Identification Labels:

1. Labeling Instructions:

   a. Indoor Equipment: **Self-adhesive, engraved, laminated acrylic or melamine label.** Provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where 2 lines of text are required, use labels 2 inches high.
   b. Outdoor Equipment: Engraved, laminated acrylic or melamine label, drilled for screw attachment.
   c. Elevated Components: Increase sizes of labels and legend to those appropriate for viewing from the floor.

2. Equipment to Be Labeled:

   a. Panelboards, electrical cabinets, and enclosures.
   b. Electrical switchgear and switchboards.
   c. Transformers.
   d. Motor-control centers.
   e. Disconnect switches.
   f. Enclosed circuit breakers.
   g. Motor starters.
   h. Push-button stations.
   i. Power transfer equipment.
   j. Contactors.
   k. Terminals, racks, and patch panels for voice and data communication and for signal and control functions.

F. Verify identity of each item before installing identification products.

G. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

H. Attach nonadhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.

I. Install system identification color banding for raceways and cables at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

J. Color-Coding for Phase **and Voltage Level** Identification, 600 V and Less: Ungrounded **service, feeder, and branch-circuit** conductors.

1. Colors for 208/120-V Circuits:

   a. Phase A: Black.
   b. Phase B: Red.
   c. Phase C: Blue.

2. Colors for 480/277-V Circuits:

   a. Phase A: Brown.
   b. Phase B: Orange.
   c. Phase C: Yellow.

3. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points.

K. Underground-Line Warning Tape: Continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade.

3.6 INSTALLATION OF HANGERS AND SUPPORTS

A. Fasten hangers and supports securely in place, with provisions for thermal and structural movement. Install with concealed fasteners unless otherwise indicated.

B. Separate dissimilar metals and metal products from contact with wood or cementitious materials, by painting each metal surface in area of contact with a bituminous coating or by other permanent separation.

C. Raceway Support Methods: In addition to methods described in NECA 1, **EMT, IMC, and RMC** may be supported by openings through structure members, as permitted in NFPA 70.

D. Multiple Raceways or Cables: Install on trapeze-type supports fabricated with steel slotted channel.

E. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

F. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods, unless otherwise indicated or required by Code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. To Steel: **Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.**
6. To Light Steel: Sheet metal screws.
7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount on slotted-channel racks attached to substrate.

G. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.7 SEISMIC REQUIREMENTS

A. Install seismic-restraint components using methods approved by the evaluation service providing required submittals for component.

B. Install bushing assemblies for anchor bolts for wall- and floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in substrate.

C. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, upper truss chords of bar joists, or at concrete members.

D. Accommodation of Differential Seismic Motion: Make flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross expansion and seismic-control joints, where adjacent sections or branches are supported by different structural elements, and where they terminate with connection to electrical equipment that is anchored to a different structural element than the one supporting them as they approach equipment.

3.8 SLEEVE AND SLEEVE SEALS INSTALLATION

A. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

B. Cut sleeves to length for mounting flush with both wall surfaces.

C. Extend sleeves installed in floors 2 inches above finished floor level.

D. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and cable unless sleeve seal is to be installed **or unless seismic criteria require different clearance.**

E. Seal space outside of sleeves with grout for penetrations of concrete and masonry **and with approved joint compound for gypsum board assemblies.**

F. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to Division 07 Section "Joint Sealants."

G. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.

H. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

I. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between cable and sleeve for installing mechanical sleeve seals.

3.9 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Comply with requirements in Division 07 Section "Penetration Firestopping."

END OF SECTION 260500