PROJECT MANUAL FOR:

MISSOURI DEPARTMENT OF TRANSPORTATION

New Office Building

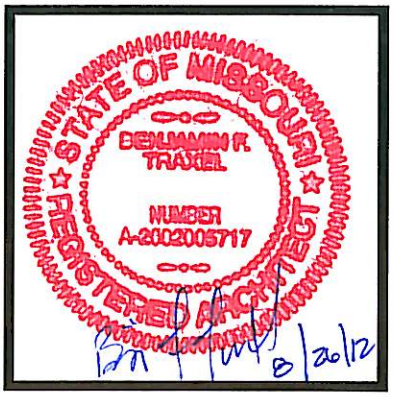
County Road 523
Poplar Bluff, MO 63901

October 8, 2012
Architect's Comm. #: 12-12

Missouri Department of Transportation — Date

Dille and Traxel, LLC — Date

ARCHITECT'S SEAL



SET NUMBER

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ARCHITECTS

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SECTION 01100 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY OF WORK

A. Project: New Office Facility For MODOT – Butler County

B. Owner: Missouri Department of Transportation

C. Architect: Dille and Traxel, LLC, Architects

1.2 WORK RESTRICTIONS

A. Contractor's Use of Premises: During construction, Contractor will have full use of site and building indicated. Contractor's use of premises is limited only by Owner's right to perform work or employ other contractors on portions of Project.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01100

SECTION 02361 - TERMITE CONTROL

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and product certificates for each type of product indicated. Include the EPA-Registered Label.

B. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located.

C. Regulatory Requirements: Formulate and apply termiticides according to the EPA-Registered Label.

D. Continuing Service: Provide 12 months' continuing service including monitoring, inspection, and re-treatment for occurrences of termite activity.

PART 2 - PRODUCTS

2.1 TERMITE CONTROL PRODUCTS

A. Soil Treatment Termiticide: Provide an EPA-registered termiticide complying with requirements of authorities having jurisdiction, in an aqueous solution.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

B. Soil Treatment Application: Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction.

1. At foundations.
2. Under concrete floor slabs on grade.
3. At hollow masonry.
4. At expansion and control joints and slab penetrations.

C. Reapply soil termiticide treatment solution to areas disturbed by subsequent excavation or other construction activities following application.

END OF SECTION 02361

SECTION 05521 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Steel pipe and tube railings.

1.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

   1. Handrails:

      a. Uniform load of 50 lbf/ ft. applied in any direction.
      b. Concentrated load of 200 lbf applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.

   2. Top Rails of Guards:

      a. Uniform load of 50 lbf/ ft.. applied in any direction.
      b. Concentrated load of 200 lbf. applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.

   3. Infill of Guards:

      a. Concentrated load of 50 lbf. applied horizontally on an area of 1 sq. ft.
      b. Uniform load of 25 lbf/sq. ft. applied horizontally.
      c. Infill load and other loads need not be assumed to act concurrently.

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

1.3 SUBMITTALS

A. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

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

1. Steel Pipe and Tube Railings:
   a. Pisor Industries, Inc.
   b. Sharpe Products.
   c. Wagner, R & B, Inc.; a division of the Wagner Companies.

2.2 METALS

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

B. Steel and Iron:

1. Tubing: ASTM A 500 (cold formed).
2. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
3. Plates, Shapes, and Bars: ASTM A 36/A 36M.
4. Castings: Either gray or malleable iron, unless otherwise indicated.

   a. Gray Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.
   b. Malleable Iron: ASTM A 47/A 47M.

2.3 MISCELLANEOUS MATERIALS

A. Fasteners: Provide concealed fasteners, unless unavoidable or standard for railings indicated.
1. Steel Railings: Plated steel fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating.

B. Anchors: Provide cast-in-place or torque-controlled expansion anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488.

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

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

E. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.

F. Grout and Anchoring Cement: Factory-packaged, nonshrink, nonmetallic grout complying with ASTM C 1107; or water-resistant, nonshrink anchoring cement; recommended by manufacturer for exterior use.

2.4 FABRICATION

A. General: Fabricate railings to comply with design, dimensions, and details indicated.

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

C. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings.

D. Form changes in direction by bending or by inserting prefabricated elbow fittings.

E. Form curves by bending in jigs to produce uniform curvature; maintain cross section of member throughout bend without cracking or otherwise deforming exposed surfaces.

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

G. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated.

H. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work, unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation.

1. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
2. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.

B. Anchor posts in concrete by inserting into preset steel pipe sleeves and grouting annular space.

C. Anchor posts to metal surfaces with oval flanges.

D. Anchor railing ends to concrete and masonry with round flanges connected to railing ends and anchored to wall construction with anchors and bolts.

E. Attach handrails to wall with wall brackets.

1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
2. For wood stud partitions, use hanger or lag bolts set into wood backing between studs.
3. For steel-framed partitions, use hanger or lag bolts set into wood backing between studs.
4. For steel-framed partitions, fasten to steel framing or concealed steel reinforcements using self-tapping screws of size and type required to support structural loads.
5. For steel-framed partitions, fasten brackets with toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.

F. Adjusting and Cleaning:

1. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting.
2. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05521

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Framing with dimension lumber.
   2. Framing with engineered wood products.
   3. Rooftop equipment bases and support curbs.
   4. Wood blocking and nailers.
   5. Wood furring.
   6. Wood sleepers.
   7. Plywood backing panels.

1.2 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.
   1. Include data for wood-preservative from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
   3. Provide dressed lumber, S4S, unless otherwise indicated.

B. Engineered Wood Products: Provide 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.
   1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA C2, except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:
   1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
   2. Wood sills, sleepers, blocking, furring, and similar concealed members in contact with masonry or concrete.
   3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.

4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 DIMENSION LUMBER FRAMING

A. Maximum Moisture Content: 19 percent.
B. Non-Load-Bearing Interior Partitions: Construction or No. 2 grade of any species.
C. Framing Other Than Non-Load-Bearing Interior Partitions: Any species and grade with a modulus of elasticity of at least 1,200,000 psi and an extreme fiber stress in bending of at least 875 psi for 2-inch nominal thickness and 12-inch nominal width for single-member use or as required by Wood Framing Schedule, refer to drawing sheet S0.0.

2.4 ENGINEERED WOOD PRODUCTS

1. Extreme Fiber Stress in Bending, Edgewise: 2600 psi for 12-inch nominal- depth members.
2. Modulus of Elasticity, Edgewise: 1,900,000 psi.

B. Wood I-Joists: Prefabricated units, I-shaped in cross section, 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, complying with DOC PS 1 or DOC PS 2, Exposure 1.
   2. Structural Properties: Provide units with depths and design values not less than those indicated.
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 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
   1. Blocking.
   2. Nailers.
   3. Rooftop equipment bases and support curbs.
   4. Cants.
   5. Furring.
B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species.
C. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
   1. Mixed southern pine, No. 2 grade; SPIB.
   2. Northern species, No. 2 Common grade; NLGA.
   3. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

2.6 PLYWOOD BACKING PANELS

A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exterior, AC, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.7 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified.
   1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
B. Power-Driven Fasteners: NES NER-272.
C. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

2.8 METAL FRAMING ANCHORS

A. Basis-of-Design Products: Subject to compliance with requirements, provide products indicated on Drawings or comparable products by one of the following:
   1. Alpine Engineered Products, Inc.
   2. Cleveland Steel Specialty Co.
   3. Harlen Metal Products, Inc.
   4. KC Metals Products, Inc.
   5. Simpson Strong-Tie Co., Inc.
   6. Southeastern Metals Manufacturing Co., Inc.
   7. USP Structural Connectors.

B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

2.9 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch nominal thickness, compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

D. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.

E. Do not splice structural members between supports, unless otherwise indicated.

F. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. NES NER-272 for power-driven fasteners.
   2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
   3.

END OF SECTION 061000

SECTION 06402 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. A. This Section includes the following:
   1. Plastic-laminate cabinets.
   2. Plastic-laminate countertops.
   3. Plastic-laminate window stools

B. Related Sections include the following:
   1. Division 6 Section "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.
   2. Division 8 Section "Flush Wood Doors."
   3. Division 9 Section "Painting" for field finishing of interior architectural woodwork.

1.3 DEFINITIONS

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

1.4 SUBMITTALS

A. Product Data: For each type of product indicated, including cabinet hardware and accessories, and finishing materials and processes.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

C. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.
   1. Plastic laminates.
   2. Thermoset decorative overlays.

D. Product Certificates: Signed by manufacturers of woodwork certifying that products furnished comply with requirements.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY CONTROL

A. Installer Qualifications: An experienced installer who has completed architectural woodwork similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Fabricator Qualifications: A firm experienced in producing architectural woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork, construction, finishes, and other requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
   1. Do not install casework where finishes are required to be installed behind or under the casework, until finish work is completed.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
   1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.

1.8 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

B. Hardware Coordination: Distribute copies of approved hardware schedule specified in Division 8 Section "Door Hardware " to fabricator of architectural woodwork; coordinate Shop Drawings and fabrication with hardware requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

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

B. Wood Products: Comply with the following:
1. Hardboard: AHA A135.4.
2. Medium-Density Fiberboard: ANSI A208.2, Grade MD-Exterior Glue.
3. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.

C. Thermoset Decorative Overlay: Particleboard complying with ANSI A208.1, Grade M-2, or medium-density fiberboard complying with ANSI A208.2, Grade MD, with surface of thermally fused, melamine-impregnated decorative paper complying with LMA SAT-
1. Color: All cabinet interiors – Off-White.

D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.
1. Acceptable Manufacturers:
a. Formica Corporation.
b. Laminart.
c. Westinghouse Electric Corp.; Specialty Products Div.
d. Wilsonart International; Div. of Premark International, Inc.
e. Nevamar
f. Abet Laminati

E. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.

2.2 INTERIOR STANDING AND RUNNING TRIM

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

B. Wood Species: Red Oak (Transparent finish)

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

2.3 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 8 Section "Door Hardware."

B. Hardware Standard: Comply with BHMA A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard.

C. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 100 degrees of opening, self-closing.

D. Wire Pulls: Brushed Stainless Steel, Back mounted, 4 inches long, 5/16 inches in diameter.

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

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

G. Drawer Slides: Side-mounted, full-extension, zinc-plated steel drawer slides with steel ball bearings, BHMA A156.9, B05091, and rated for the following loads:
1. Box Drawer Slides: 100 lbf.
2. File Drawer Slides: 200 lbf.
3. Pencil Drawer Slides: 45 lbf.

H. Door Locks: BHMA A156.11, E07121.

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

J. Grommets for Cable Passage through Countertops: 2-inch black, molded-plastic grommets and matching plastic caps with slot for wire passage.
1. Product: Subject to compliance with requirements, provide "OG series" by Doug Mockett and Co., Inc.

K. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

L. Solid Stainless Steel: Polished No. 4 finish (satin brushed)

M. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.4 INSTALLATION MATERIALS

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

B. Screws: Select material, type, size, and finish required for each use. Comply with ASME B18.6.1 for applicable requirements.
1. For finish work use finishing screws designed for attaching to metal studs.

C. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.

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

2.5 FABRICATION, GENERAL

A. Interior Woodwork Grade: Provide Premium grade interior woodwork complying with the referenced quality standard.

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

C. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
   1. Edges of Solid-Wood (Lumber) Members 3/4 Inch Thick or Less: 1/16 inch.
   2. Edges of Rails and Similar Members More Than 3/4 Inch Thick: 1/8 inch.

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

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

2.6 PLASTIC-LAMINATE CABINETS

A. Quality Standard: Comply with AWI Section 400 requirements for laminate cabinets.

B. Grade: Premium.

C. AWI Type of Cabinet Construction: Flush overlay.

D. Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:
   1. Horizontal Surfaces: GP-50.
   2. Vertical Surfaces: GP-28
   3. Edges: GP-28

E. Materials for Semiexposed Surfaces: Provide surface materials indicated below:
   1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, Grade CL-20
   2. Drawer Sides and Backs: Thermoset decorative overlay.
   3. Drawer Bottoms: Hardwood plywood.

F. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
   1. Provide Architect's selections from laminate manufacturer's full range of colors and finishes in the following categories:
      a. Solid colors.
      b. Wood grains.
      c. Patterns

2.7 PLASTIC-LAMINATE COUNTERTOPS

A. Quality Standard: Comply with AWI Section 400 requirements for high-pressure decorative laminate countertops.

B. Grade: Premium.

C. High-Pressure Decorative Laminate Grade: GP-50.

D. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
   1. Provide Architect's selections from manufacturer's full range of colors and finishes in the following categories:
      a. Solid colors.
      b. Patterns.

E. Edge Treatment: Same as laminate cladding on horizontal surfaces.

F. Core Material: Medium-density fiberboard made with exterior glue.

G. Core Material at Counters with Sinks: Plywood made with exterior glue.

2.8 PLASTIC-LAMINATE WINDOW STOOLS

A. Grade: Premium.

B. High-Pressure Decorative Laminate Grade: GP-50.

C. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
   1. Provide Architect's selections from manufacturer's full range of colors and finishes in the following categories:
      a. Solid colors.
      b. Patterns.

D. Edge Treatment: Same as laminate cladding on horizontal surfaces.

E. Core Material: Medium-density fiberboard made with exterior glue.

F. Core Material at Counters with Sinks: Plywood made with exterior glue.

PART 3 - EXECUTION

3.1 PREPARATION

A. Condition woodwork to average prevailing humidity conditions in installation areas before installation.

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

A. Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in Part 2 of this Section for type of woodwork involved.

B. 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.

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

D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

E. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to the greatest extent possible. Do not use pieces less than 36 inches long, except where necessary. Stagger joints in adjacent and related members. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base, if finished.
   1. Install standing and running trim with no more than 1/8 inch in 96-inch.
   2. Counter sink all anchors and fill holes.

F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
   1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
   2. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

G. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
   1. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
   2. Caulk space between backsplash and wall with sealant specified in Division 7 Section "Joint Sealants."

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06402

SECTION 07210 - BUILDING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Concealed building insulation.

1.2 SUBMITTALS

A. Product Data: For each product indicated.

B. Product test reports.

C. Research/evaluation reports.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84 for surface-burning characteristics and by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

PART 2 - PRODUCTS

2.1 INSULATING MATERIALS

A. General: Provide insulating materials that comply with requirements and with referenced standards and, for preformed units, in sizes to fit applications indicated, selected from manufacturer's standard thicknesses, widths, and lengths.

B. Mineral-Fiber-Blanket Insulation: ASTM C 665, Type I, faced with fibers manufactured from glass,, with flame-spread index of 25 or less.

2.2 ACCESSORIES

A. Vapor Retarder: Polyethylene, 6 mils thick.

B. 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. General: Install insulation to comply with insulation manufacturer's written instructions applicable to products and application indicated. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

B. Installation of General Building Insulation: Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

1. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements:

    a. Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
    b. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

2. For wood-framed construction, install mineral-fiber blankets according to ASTM C 1320 and as follows:

    a. With faced blankets having stapling flanges, secure insulation by inset, stapling flanges to sides of framing members.
    b. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to produce airtight installation after concealing finish material is in place.

3. Stuff glass-fiber, loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.

END OF SECTION 07210

SECTION 07412 - METAL WALL PANELS

PART 1 - GENERAL

1.1 DESCRIPTION

A. General:
1. Furnish all labor, material, tools, equipment and services for all preformed [# choose one: fascia, walls, equipment screens] as indicated, in accord with provisions of Contract Documents.
2. Completely coordinate with work of all other trades.
3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

1.2 1.02 QUALITY ASSURANCE

A. A. Applicable standards:
1. AISC: "Steel Construction Manual" American Institute of Steel Construction.
2. AISI: "Cold Form Steel Design Manual," American Iron and Steel Institute.
3. ASTM A792-83-AZ50: Specifications for steel sheet, aluminum-zinc alloy coated (galvanized) by the hot dip process, general requirements (Galvalume®).

B. Manufacturer's qualifications:
1. Manufacturer has a minimum of three years experience in manufacturing metal wall systems of this nature. Panels specified in this section shall be produced in a factory environment (not job site roll formed) with fixed-base roll forming equipment assuring the highest level of quality control. A letter from the manufacturer certifying compliance will accompany the product material submittals.

1.3 SUBMITTALS

A. Shop drawings:
1. 1. Submit complete shop drawings and erection details to the architect for review. Do not proceed with manufacture prior to review of shop drawings. Do not use drawings prepared by the architect for shop or erection drawings.
2. Shop drawings show methods of erection, elevations and plans of roof and wall panels, sections and details, anticipated loads, flashings, sealants, interfaces with all materials not supplied and proposed identification of component parts and their finishes.

B. Samples:
1. 1. Submit samples and color chips for all proposed finishes.
   a. Submit one 8 inch long sample of panel, including clips.
   b. Submit two 3 inch x 5 inch color chip samples in color selected by the architect (owner).

C. Warranty(s):

1. Metal wall system manufacturer, upon final acceptance for project, furnish a warranty covering Galvalume Plus® against rupture, structural failure and perforation due to normal atmospheric corrosion exposure for a period of 20 years.
2. Covering paint finish against cracking, checking, blistering, peeling, flaking, chipping, chalking and fading for a period of 20 years for wall panels (premium fluorocarbon coating produced with Kynar 500 or Hylar 5000 resin)].

D. Metal wall system fabrication certification:
1. Submit a letter from the metal wall system manufacturer certifying the FW-120 wall panels have been produced in a factory environment (not job site rollformed) with fixed-base roll forming equipment.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery:
1. Deliver metal wall system to job site properly packaged to provide protection against transportation damage.

B. Handling:
1. Exercise extreme care in unloading, storing and erecting metal wall system to prevent bending, warping, twisting and surface damage.

C. Storage:
1. Store all material and accessories above ground on well skidded platforms. Store under waterproof covering. Provide proper ventilation of metal wall system to prevent condensation build-up between each panel or trim/flashing component.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Basis of design: M.B.C.I. "PBR" Panel

B. Metal wall system profile: 11/4 inch deep x 36 inch width.

C. Gauge: 29 gauge.

D. Substrate: Galvalume® steel sheet, minimum yield of 50,000 PSI.

E. Texture: Smooth.

F. Finish: Premium fluorocarbon coating produced with Kynar 500 or Hylar 5000 resin.

G. Color : Selected from metal wall system manufacturer's standard offering.

2.2 FABRICATION

A. Material shall be in-line tension leveled prior to roll forming finished panel profile.

B. Roll form panels in continuous lengths, full length of detailed runs.

C. Standard panel length shall be no more than 45 feet long.

D. Fabricate trim/flashing and accessories to detailed profiles.

E. Fabricate trim/flashing from same material as panel.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examination:
1. Inspect installed work of other trades and verify that such work is complete to a point where this work may continue.
2. Verify that installation may be made in accordance with approved shop drawings and manufacturer's instructions.

B. Discrepancies:
1. In event of discrepancy, notify the architect (owner).
2. Do not proceed with installation until discrepancies have been resolved.

3.2 INSTALLATION

A. Install metal wall system so that it is weathertight, without waves, warps, buckles, fastening stresses or distortion.

B. Install metal wall system in accordance with manufacturer's instructions and shop drawings.

C. Provide concealed anchors at all panel attachment locations.

D. Install panels plumb, level and straight with seams parallel, conforming to design as indicated.

3.3 CLEANING, PROTECTION

A. Dispose of excess materials and remove debris from site.

B. Clean work in accordance with manufacturer's recommendations.

C. Protect work against damage until final acceptance.

D. Replace or repair to the satisfaction of the architect (owner), any work work that becomes damaged prior to final acceptance. END OF 07412

SECTION 07610 METAL ROOFING

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section includes:
1. Metal Roof Panels
2. Flashing and Counter Flashing
3. Trims
4. Gutters and Downspouts
5. Soffit Panels
6. Coping
7. Thermal Insulation for Metal Roof Panels

B. General:
1. Furnish all labor, material, tools, equipment and services for all preformed ?as indicated, in accord with provisions of Contract Documents.
2. Completely coordinate with work of all other trades.
3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

1.2 QUALITY ASSURANCE

A. Applicable Standards:
1. SMACNA: "Architectural Sheet Metal Manual", Sheet Metal and Air Conditioning Contractors National Association, Inc.
2. LGSI: “Light Gage Structural Institute”
3. AISC: "Steel Construction Manual", American Institute of Steel Construction.
4. AISI: "Cold Form Steel Design Manual", American Iron and Steel Institute (1996 Edition).
5. UL580: " Tests for Uplift Resistance of Roof Assembles", Underwriters Laboratories, Inc.
6. UL2218: Class 4 Impact Resistance Rating
7. Dade County (Florida) Acceptance Report Numbers 00-1204.01(Dated 5/03/06) and 00-1205.01.
8. ICBO: Evaluation Report No. ER-5409, ICBO Evaluation Service, Inc.
9. ASTM E 1680-95: "Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems, American Society for Testing and Materials.
10. ASTM E 1646-95: "Standard Test Method for Water Penetration Through Exterior Metal Roof Panel Systems, American Society for Testing and Materials.
11. ASTM A 792-83-AZ50 (Painted) & ASTM A792-83-AZ55 (Bare Galvalume Plus®): "Specifications for Steel Sheet, Aluminum-Zinc Alloy Coated by the Hot Dip Process, General Requirements (Galvalume®)", American Society for Testing and Materials.
12. ASTM E 1514-93: "Standard Specification for Structural Standing Seam Steel Roof Panel Systems", American Society for Testing and Materials.
13. ASTM E 408-71: Standard Test Method for Total Normal Emittance of Surfaces Using Inspection- Meter Techniques. (Energy Star? for Roof Products).

14. ASTM E 903-96 Standard Test Method for Solar Absorptance, Using Integrating Spheres. (Energy Star? for Roof Products)

B. Manufacturer's Qualifications:
1. Manufacturer has a minimum of five years experience in manufacturing metal roof systems of this nature. Panels specified in this section shall be produced in a factory environment (not with a portable roll former) with fixed-base roll forming equipment and in line leveling, assuring the highest level of quality control. A letter from the manufacturer certifying compliance will accompany the product material submittals..

1.3 SYSTEM PERFORMANCE REQUIREMENTS

A. Performance Testing:
1. Metal roof system must be tested in accordance with Underwriters Laboratories, Inc. (UL) Test Method 580 "Tests for Uplift Resistance of Roof Assemblies".
2. Metal roof system must be tested in accordance with ASTM E 1592-95 for negative loading. Determine panel bending and clip-to-panel strength by testing in accordance with ASTM E 1592-95 procedures. Capacity for gauge, span or loading other than those tested may be determined by interpolating between test values only.
3. Metal roof system must meet the air infiltration requirements of ASTM E 1680-95 when tested with a 6.24 PSF pressure differential. The resulting air infiltration leakage rate will be a minimum of ?.
4. Metal roof system must meet the water penetration requirements of ASTM E 1646-95 when tested with a 12.00 PSF pressure differential with no uncontrollable water leakage when five gallons per hour of water is sprayed per square foot of roof area.
5. Metal Roof Panels shall be high reflectance and high remittance in accordance with Energy Star?. Initial Reflectance (Galvalume Only) shall be at least 0.68 when tested with ASTM E- 903. The three year aged reflectance shall be at least 0.57, when tested in accordance with ASTM E-1918 (Measured As Solar Reflectivity, Not Visible Reflectance).

1.4 DESIGN REQUIREMENTS

A. Roof Design Loads:
1. Design criteria shall be in accordance with the IBC. 2003
2. Dead Loads
   a. The dead load shall be the weight of the SSMR system. Collateral loads, such as sprinklers, mechanical and electrical systems, and ceilings shall not be attached to the panels.
3. Live Loads
   a. The panels and concealed anchor clips shall be capable of supporting a minimum uniform live load of 20 psf.
4. Roof Snow Loads
   a. The design roof snow loads shall be as shown on the contract drawings.
5. Wind Loads
   a. Wind Uplift: Provide metal roof panel systems which have been tested in accordance with UL 580 and listed in the UL "Roofing Materials and Systems Directory" for the following rating: Class 60 minimum.
6. Thermal Loads

a. Provide for expansion and contraction of system components due to ambient temperature and solar heat gain. Accommodate movement due to temperature change without buckling, undue stress on structural elements, reduction of performance, or other damaging effects.Anticipated ambient temperature range: Minus 5 to plus 140 degrees F (minus 21 to plus 60 degrees C).

1.5 SUBMITTALS

A. Shop drawings:
1. Submit complete shop drawings and erection details, approved by the metal roofing manufacturer, to the architect (owner) for review. Do not proceed with manufacture of roofing materials prior to review of shop drawings and field verification of all dimensions. Do not use drawings prepared by the architect (owner) for shop or erection drawings.
2. Shop drawings show methods of erection, roof and wall panel layout, sections and details, anticipated loads, flashings, sealants, interfaces with all materials not supplied and proposed identification of component parts and their finishes.

B. Samples:
1. Submit samples and color chips for all proposed finishes.
   a. Submit one 8-inch long sample of panel, including clips.
   b. Submit two 3 inches x 5 inch color chip samples in color selected by the architect.

C. Warranties: Metal roof system manufacturer shall submit a specimen copy of the warranty upon final acceptance of the project. Provide one of the following warranties.
1. Finish Warranty:
   a. Covering bare metal against rupture, structural failure and perforation due to normal atmospheric corrosion exposure for a period of 20 years.
   b. Covering panel finish against cracking, checking, blistering, peeling, flaking, chipping, chalking and fading for a period of twenty (20) years.

2. Weathertightness Warranty: Metal roof system manufacturer shall submit a specimen copy of manufacturer's Weathertightness Warranty, including evidence of application for warranty and manufacturer's acceptance of the applicator and warranty conditions.
   a. Standard Warranty

D. Metal Roof System Fabrication Certification:
1. Submit a letter from the metal roof system manufacturer certifying the panels have been produced in a factory environment (not job site roll formed) with fixed-base roll forming equipment and in line leveling

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. .Delivery:
1. Deliver metal roof system to job site properly packaged to provide protection against transportation damage.

B. B.Handling:
1. Exercise extreme care in unloading, storing and erecting metal roof system to prevent bending, warping, twisting and surface damage.

C. Storage:
   1. Store bundled sheets off the ground sufficiently high enough to allow air circulation beneath bundle and to prevent rising water from entering bundle. Slightly elevate one end of bundle. Prevent rain from entering bundle by covering with tarpaulin, making provision for air circulation between draped edges of tarpaulin and the ground. Prolonged Storage of sheets in a bundle is not recommended. If conditions do not permit immediate erection, extra care should be taken to protect sheets from staining or water marks.

D. Standard Warranty
   1. For a period of twenty (20) years from the date of substantial completion, the roofing manufacturer WARRANTS to the Building Owner that the roofing manufacturer's furnished roof panels, flashing, and related items used to fasten the roof panels and flashing to the roof structure ("Roof System") will not allow intrusion of water from the exterior of the roofing manufacturer's Roof System into the building envelope, when exposed to ordinary weather conditions and ordinary wear and usage. The Date of substantial completion is the date that is certified by the Architect, Owner, or Owner's Representative, when the roofing manufacturer's Roofing System is completed and accepted by or on behalf of the Owner.
   2. The Roofing Installer shall have the sole and exclusive obligation for all warranty work commencing on the date of substantial completion up to and until the roof system has performed leak free for (24) consecutive months. The sole and exclusive obligation for all warranty work commencing on the date the roof has been leak free for (24) consecutive months and under all circumstances terminates on the Anniversary of the date certified as substantial completion of the roofing manufacturers roof system.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Metal roof system profile: 1.2 inch high x 3/4" inch wide rib x 16" wide, striated panel.

B. Metal roof system style:
   1. Vertical leg, concealed fastener, standing seam, utilizing male and female rib configurations, with factory applied hot-melt mastic in female rib, continuously locked together by an electrically powered mechanical seaming device during installation.

C. Gauge: 24

D. Substrate: Galvalume® steel sheet, minimum yield of 50,000 PSI.

E. Clip: Two piece floating clip, 18 gauge base, 24 gauge top, with factory applied mastic (# UL-90 rated - Underwriters Laboratories).

F. Texture: Smooth

G. Finish: Premium fluorocarbon coating produced with Kynar 500 or Hylar 5000 resin (20 year warranty).

H. Color: .Metal roof system manufacturer's standard offering.

I. Basis of design: BattenLoc, MBCI - Houston, TX - (281) 445-8555.

2.2 FLASHING AND COUNTERFLASHING

A. Gauge: 24 gauge

B. Texture: Smooth

C. Finish: Premium fluorocarbon coating produced with Kynar 500 or Hylar 5000 resin (20 year warranty).

D. Color: Metal roof system manufacturer's standard offering.

2.3 TRIMS

A. Gauge: 24 gauge

B. Texture: Smooth

C. Finish: Premium fluorocarbon coating produced with Kynar 500 or Hylar 5000 resin (20 year warranty).

D. Color: Metal roof system manufacturer's standard offering.

2.4 COPING

A. Gauge: 24 gauge

B. Texture: Smooth

C. Finish: Premium fluorocarbon coating produced with Kynar 500 or Hylar 5000 resin (20 year warranty).

D. Color: Metal roof system manufacturer's standard offering.

2.5 GUTTERS AND DOWNSPOUTS

A. Gauge: 24 gauge

B. Texture: Smooth

C. Finish: Premium fluorocarbon coating produced with Kynar 500 or Hylar 5000 resin (20 year warranty).

D. Color: Metal roof system manufacturer's standard offering.

E. Mounting: Gutter straps 16" O.C.

2.6 SOFFITS

A. Type: V-Groove and Vented V-Grove (4' O.C.) 3/8" x 12"x 29 guage steel or .018 aluminum.

B. Texture: Smooth

C. Finish: Siliconized Polyester Finish

D. Color: Metal roof system manufacturer's standard offering.

2.7 MISCELLANEOUS MATERIALS

A. Fasteners:
1. All self-tapping/self-drilling fasteners, bolts, nuts, self-locking rivets and other suitable fasteners shall be designed to withstand specified design loads.
2. Use long life fasteners for all interior and exterior metal roof system applications.
3. Provide fasteners with a factory applied coating in a color to match metal roof system application.
4. Provide neoprene washers under heads of exposed fasteners.
5. Locate and space all exposed fasteners in a true vertical and horizontal alignment. Use proper torque settings to obtain controlled uniform compression for a positive seal without rupturing the neoprene washer.

B. Accessories:
1. Provide all components required per the metal roof system manufacturer's approved shop drawings for a complete metal roof system to include panels, panel clips, closures, sealants, fillers and any other required items.
   a. All outside closures will be fabricated from Galvalume Plus® or Pre-Painted Galvalume? sheet steel of the same gauge, finish and color as the panels.
   b. All tape seal is to be a pressure sensitive, 100 percent solids, polyisobutylene compound sealing tape with a release paper backing. Provide permanently elastic, non-sagging, non-toxic, non-staining tape seal approved by the metal roof system manufacturer.
   c. All tube sealant is to be a one-part elastomeric polyurethane sealant approved by the metal roof system manufacturer.

2.8 FABRICATION

A. Material shall be in-line leveled prior to roll forming the panel profile.

B. Where possible, roll form panels in continuous lengths, full length of detailed runs.

C. Standard panel length shall be no more than 50 feet long.

D. Fabricate trim/flashing and accessories to detailed profiles.

E. Fabricate trim/flashing from same material as panel.

2.9 PREFABRICATED CURBS AND EQUIPMENT SUPPORTS

A. Comply with loading and strength requirements as indicated where units support work of other trades. Coordinate dimensions of curbs and supports with equipment supplier/manufacturer.

B. Fabricate curbs of structural quality aluminum (Min. .080 in. thickness for mechanical gear up to 1000 lbs; .125 in. thickness for mechanical gear between 1000 lbs. and 2000 lbs.; use a two curb system per the manufacturer above 2000 lbs.), factory primed and prepared for painting with mitered and welded corner joints. Provide integral cap cells and water diverter crickets. The upper flange of the curb must be a minimum of 18" above the water diverter. Curbs shall be designed to install under metal roof system on the high side and over metal roof system on the low side.

C. Minimum height of prefabricated curb will be 8 inches above the finished metal roof system.

D. Curbs shall be constructed to match the slope of the roof and provide a level top surface for mounting equipment.

E. Curb flanges must be constructed to match the configuration of the metal roof panels and extend to a panel rib on each side. Minimum distance between curb wall and panel rib is 6".

F. Curb manufacturer will provide their own curb structural support system that can be installed between the purlins that will allow proper thermal movement of the curb with the roofing system.

G. Submit roof curb manufacturer's shop drawings to metal roof system manufacturer for review prior to fabrication (refer to metal roof system manufacturer's standard installation details). Metal roof system manufacturer will review roof curb manufacturer's shop drawings for compatibility with metal roof system.

2.10 PREFABRICATED ROOF JACKS

A. Pipe flashings shall be a one piece EPDM (ethylene propylene diene monomer) molded rubber boot having a serviceable temperature range of -65°F to 212°F (for standard applications) and shall be resistant to ozone and ultraviolet rays. Units shall have an aluminum flanged base ring. Do not install pipe flashings through any panel seams - install ONLY in the flat portion of the panel.

2.11 THERMAL INSULATION FOR FIELD-ASSEMBLED METAL ROOF PANELS

A. Manufacturer:

1. Thermal Design Simple Saver System
   Box 324
   Stoughton, WI 53589
   608-873-8170
   608-873-8274
   Box 468
   Madison, NE 68748
   800-255-0776

B. Quality Assurance:

1. Provide the materials in original manufacturer's packages together with detailed instructions and project drawings of the installation. Materials shall be inspected for damage, proper sizes and quantities upon delivery and stored in a dry, secure manner. Post the detailed training instructions, project specific safety drawings, and plans for OSHA compliance using the product. Installation shall proceed with care to assure proper sealing of the liner fabric. Insulation shall be placed on (roof) or behind (walls) the liner fabric in the full-specified thickness without voids or compression. Notify Thermal Design (800-255-0776) immediately of any damages, improper sizes or shortages. No changes or substitutions will be allowed unless submitted at least 10 days prior to bid date and in compliance with Simple Saver System standards as set forth in this specification. Substitutions of systems that do not have a continuous vapor barrier on the inside plane of the purlins or girts will not be allowed. Purlins, girts and insulation must be completely isolated from the inside conditioned air with an effective vapor barrier. Taping or stapling of vapor barrier lap joints is not acceptable. Sealing field joints with a permanent vapor barrier lap sealant is required. Field seams, if any, shall be made on a structural member and mechanically attached with a metal band and fasteners along its full length.
2. All exposed parts of the system shall be Class A material and have flame spread of 25 or less based on ASTM E84 standards. Vapor barrier fabric shall be white or colored woven coated fabric with opaque light-gray back and double extrusion-welded seams fabricated in one piece, to fit not less than the full bay length by the width of the building. Buildings more than 100' wide may have field seams on the bottom of a purlin but no less than 50' apart. Any field seams must be sealed with vapor barrier lap sealant. Wall bay minimum fabric size shall be not less than one entire wall bay or end wall column space from the ceiling to the floor. Perimeter edges of the vapor barrier fabric shall be trimmed and sealed to the adjoining steel or fabric with vapor barrier lap sealant. All edges of liner fabric, including field seams, shall be mechanically fastened with steel retaining straps the full perimeter. In the event that the crew is not experienced in the installation procedures, videotaped or on-site installation training shall be requested by the installing contractor from Thermal Design to assure proper installation procedures.
3. Submittals: Include manufacturer's product brochures; component specifications, samples of the painted support strapping, and samples of the Syseal® reinforced polyethylene vapor barrier fabric, including a sample of the extrusion welded seam; specific detailed drawings from Thermal Design for the project showing purlin spacings, support strap locations and spacings, fastening points, liner fabric sizes and locations; insulation widths and thicknesses, sizes and locations and detailed installation instructions for quality assurance and OSHA compliance.
4. Safety Compliance Clause: Detailed installation instructions are provided to assure proper installation and function for OSHA safety compliance as an alternative form of fall protection in metal building structures. Fall protection certificate available free of charge from Thermal Design. (U.S. Patents #4446664, #4573298, #5901518, and #5953875)

C. Products:

1. Acceptable systems shall be the Simple Saver insulation system manufactured by Thermal Design with an installed total roof insulation R-value of R-30 and an average installed thickness of 9". Roof system shall be a double-layer system . A thermal break shall be applied between metal panel and metal structure.

2. Steel Strap: 100 KSI minimum yield high tensile strength steel, galvanized, primed and then painted the specified color on the exposed side with a clear coat primer on the unexposed side. Minimum size shall be 0.02 x 1" x continuous length. The strap color

shall be : UVMAX® 8 White. Traverse strap pattern shall include one strap six (6) inches away from each rafter flange with the remaining space between rafters divided into equal spaces not to exceed five (5) feet. Longitudinal straps shall be nominally thirty (30) inches on-center, with two adjacent straps at the ridge line.

3. Fasteners: #12 x 3/4", plated self-drilling screws with sealing washers painted to match the specified color for fastening to light gauge steel (up to 12 GA purlins) or #12 x 11/4" plated self- drilling screws with sealing washers, painted to match the specified color for heavier gauge steel (up to 3/8" purlins/bar joist). Special fasteners for wood, concrete and other structure types are available from Thermal Design and should be used when appropriate. Always install two fasteners in the end of each strap for safety and to withstand installation stress, and one fastener at all other designated fastening points.

4. Syseal® Fabric: Shall be woven reinforced high-density polyethylene yarns coated on both sides with a continuous white or colored polyethylene film. The fabric grade for the roof shall be: Syseal® FP (White), The fabric grade for the walls shall be (select one): Syseal® FP. The fabric shall comply with UL/ULC 723 or ASTM E84, and be Class A compliant with a low flame spread index of 25 or less based on ASTM E84 test standards. This material shall be manufactured in large custom pieces by extrusion welding from roll goods. Pieces shall be fabricated to substantially fit the large defined building areas with minimum practical sealing to be done on job site. Fabric shall be folded to allow for rapid pull-out on the strap support system. The fabric shall be certified for free fall protection by the manufacturer.

5. Liner fabric perm rating shall be: 0.02 grains per hour per square foot based on ASTM E96, procedure B .

6. Sealants: Shall be Simple Saver System G524 high tack solvent-based vapor barrier sealant for sealing vapor barrier laps and/or Syseal® Tape (double-sided bonding tape) 3/4" wide by 1/32" thick extruded vapor barrier sealant by Thermal Design.

7. Insulation: Shall be formaldehyde-free fiberglass blanket or batt insulation meeting ASTM C991 Type 1, ASTM E136 and ASTM E84 or other insulation form as may be recommended and submitted by the system manufacturer and approved by the architect during submittals.

8. Insulation Hangers: Shall be Fast-R™ insulation hangers for supporting insulation between wall girt or roof purlins in roof pitches over 4:12.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examination:
   1. Inspect installed work of other trades and verify that such work is complete to a point where this work may continue.
   2. Verify that installation may be made in accordance with approved shop drawings and manufacturer's instructions. This specifically includes verifying that secondary structural members and/or decking are installed to meet UL and building code requirements. Coordinate with metal roof system manufacturer to insure that reduced clip spacings at eave, rake, ridge and corner areas are accommodated.

B. Discrepancies:
   1. In event of discrepancy, notify the architect.
   2. Do not proceed with installation until discrepancies have been resolved.

3.2 INSTALLATION

A. Install metal roof system so that it is weathertight, without waves, warps, buckles, fastening stresses or distortion, allowing for expansion and contraction.

B. Install metal roof system in accordance with manufacturer's instructions and shop drawings.

C. Provide concealed anchors at all panel attachment locations.

D. Install panels plumb, level and straight with seams and ribs parallel, conforming to design as indicated.

3.3 ROOF CURB INSTALLATION

A. Comply with metal roof system manufacturer's shop drawings, instructions and recommendations for installation of roof curbs. Refer to metal roof system manufacturer's standard installation details. Anchor curbs securely in place with provisions for thermal and structural movement.

3.4 CLEANING, PROTECTION

A. Dispose of excess materials and remove debris from site.

B. Clean work in accordance with manufacturer's recommendations.

C. Protect work against damage until final acceptance. Replace or repair to the satisfaction of the architect (owner), any work that becomes damaged prior to final acceptance.

D. Touch up minor scratches and abrasions with touch up paint supplied by the metal roof system manufacturer.

E. Do not allow panels or trim to come in contact with dissimilar metals such as copper, lead or graphite. Water run-off from these materials is also prohibited. This specifically includes condensate from roof top units. A/C units.

3.5 SIMPLE SAVER ROOF SYSTEM:

A. Cut to length and install painted steel straps in the pattern and spacings as shown on the project shop drawings. The straps are installed in tension and span immediately below the bottom plane of the purlins. Position the pre-folded vapor barrier liner fabric on the strap platform along one eave purlin. Clamp the two bottom corners squarely at the eave and centered on the bay. Pull the other end of the pleat-folded fabric across the building width on the strap platform but below the purlins, pausing only at the ridge to fasten the straps and fabric into position where the plane of the roof changes. Once positioned, the remaining fasteners are installed from the bottom side

at each purlin/strap intersection and the edges are sealed and trimmed along the rafters. A similar method can be used starting at the ridge purlin space and pulling the fabric to each eave.

B. Insulation is unpacked and placed on the vapor liner system. Shake to the specified thickness. In two-layer systems, the second layer of insulation is placed over and perpendicular to the purlins as the roof sheeting is applied. It is important that the insulation cavity be filled or the cavities be ventilated to minimize the probability of condensation.

END OF SECTION 07610

SECTION 07920 - 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, One of the Following:

1. Single-component, nonsag polysulfide sealant, ASTM C 920, Type S; Grade NS; Class 12-1/2; Uses NT, M, G, A, and O.
2. Single-component, neutral-curing silicone sealant, ASTM C 920, Type S; Grade NS; Class 25; Uses T, NT, M, G, A, and O.
3. Single-component, nonsag urethane sealant, ASTM C 920, Type S; Grade NS; Class 25; and Uses NT, M, 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.

H. Acoustical Sealant for Exposed Interior Joints:

1. Nonsag, paintable, nonstaining, latex 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 07920

SECTION 08100 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Standard and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.
3. Louvers installed in hollow metal doors
4. Light frames and glazing installed in hollow metal doors.

B. Related Sections:

1. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
2. Division 08 Sections "Flush Wood Doors" and "Stile and Rail Wood Doors" for wood doors in hollow metal frames.
3. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
4. Division 08 Sections "Door Hardware" and "Access Control Hardware" for door hardware for hollow metal doors and frames.
5. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.
6. Division 26 "Electrical" Sections for electrical connections including conduit and wiring for door controls and operators installed on frames with factory installed electrical knock out boxes.
7. Division 28 Section "Access Control" for access control devices installed at door openings and provided as part of a security access control system.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
9. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
10. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
11. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Doors Under Specified Pressure Differences Across the Specimens.
12. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
13. ASTM E 413 - Classification for Rating Sound Insulation.
14. ASTM E1332 - Standard Classification for Determination of Outdoor-Indoor Transmission Class.
15. ANSI/NAMM/HMMA 867-06 - Guide Specifications for Commercial Laminated Core Hollow Metal Doors and Frames.
16. ANSI/BHMA A156.15 - Hardware Preparation in Steel Doors and Frames.
17. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
18. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
19. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
20. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
21. UL 10C - Positive Pressure Fire Tests of Door Assemblies; UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of anchorages, joints, field splices, and connections.
6. Details of accessories.
7. Details of moldings, removable stops, and glazing.
8. Details of conduit and preparations for power, signal, and control systems.

D. Samples for Verification:

1. Samples are only required by request of the architect and for manufactures that are not current members of the Steel Door Institute.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.

B. Quality Standard: In addition to requirements specified, comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40" above sill) or UL 10C..

1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
3. Smoke Control Door Assemblies: Comply with NFPA 105.

a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.

E. Energy Efficient Exterior Openings: Comply with minimum thermal ratings, based on ASTM C1363. Openings to be fabricated and tested as fully operable, thermal insulating door and frame assemblies.

1. Thermal Performance (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM C1363 and meet or exceed the following requirements:

a. Door Assembly Operable U-Factor and R-Value Ratings: U-Factor 0.29, R-Value 3.4, including insulated door, thermal-break frame and threshold.

2. Air Infiltration (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM E283 to meet or exceed the following requirements:

a. Rate of leakage of the door assembly shall not exceed 0.25 cfm per square foot of static differential air pressure of 1.567 psf (equivalent to 25 mph wind velocity).

F. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.6 PROJECT CONDITIONS

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

1.7 COORDINATION

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

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Amweld Building Products, LLC.

2. CECO Door Products.
3. Curries Company.
4. Steelcraft.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 STANDARD HOLLOW METAL DOORS

A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

B. Exterior Doors: Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A924 A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model, ANSI/SDI A250.4 for physical performance level, and HMMA 867 for door construction.

1. Design: Flush panel.
2. Core Construction: Foamed in place polyurethane and steel stiffened laminated core with no stiffener face welds, in compliance with HMMA 867 "Laminated Core".

    a. Provide 22 gauge steel stiffeners at 6 inches on-center internally welded at 5" on-center to integral core assembly, foamed in place polyurethane core chemically bonded to all interior surfaces. No stiffener face welding is permitted.
    b. Thermal properties to rate at a fully operable minimum U-Factor 0.29 and R-Value 3.4, including insulated door, thermal-break frame and threshold.

        1) Kerf Type Frames: Thermal properties to rate at a fully operable minimum U-Factor 0.36 and R-Value 2.8, including insulated door, kerf type frame, and threshold.

3. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053-inch - 1.3-mm) thick steel, Model 2.
4. Vertical Edges: Vertical edges to have the face sheets joined by a continuous weld extending the full height of the door. Welds are to be ground, filled and dressed smooth. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.

6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

C. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, or one-piece polystyrene core, securely bonded to both faces.

    a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.

3. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-mm) thick steel, Model 2.
4. Vertical Edges: Vertical edges to have the face sheets joined by a continuous weld extending the full height of the door. Welds are to be ground, filled and dressed smooth. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).
5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

2.4 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Exterior Masonry Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
3. Frames for Level 3 Steel Doors (up to 48 inches in width): Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.
4. Frames for Level 3 Steel Doors (48 inches and up in width): Minimum 12 gauge (0.081-inch -2.7-mm) thick steel sheet.
5. Frames for Level 2 Steel Doors: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.

C. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames, with the exception of slip-on drywall types, with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
3. Frames for Level 2 Steel Doors: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
4. Frames for Level 3 Steel Doors (up to 48 inches in width): Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
5. Frames for Level 3 Steel Doors (48 inches and up in width): Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.
6. Frames for Wood Doors: Minimum 16 gauge (0.053-inch-1.3-mm-) thick steel sheet.
7. Frames for Borrowed Lights: Minimum 16 gauge (0.053-inch-1.3-mm-) thick steel sheet.

D. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

E. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.5 ENERGY EFFICIENCY HOLLOW METAL FRAMES

A. Weatherstripped Frames: Subject to the same compliance standards and requirements as standard hollow metal frames, provide where indicated weatherstripped profiles with 1/8" integral kerf formed into the frame soffit able to receive manufacturer's listed gasket material. Available for use in both masonry and drywall construction, with fire rating up to 3 hours complying with NFPA 105, UL 1784, and ASTM E-283 Test criteria.

2.6 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud Wall Type: Designed to engauge stud and not less than 0.042 inch thick.
3. Compression Type for Drywall Slip-on (Knock-Down) Frames: Adjustable compression anchors.

B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.7 LOUVERS

A. Metal Louvers: Door manufacturer's standard metal louvers unless otherwise indicated.

1. Blade Type: Vision proof inverted V or inverted Y.
2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.

1. Manufacturers: Subject to compliance with requirements, provide door manufacturers standard louver to meet rating indicated.
2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

2.8 LIGHT OPENINGS AND GLAZING

A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricators shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.

C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames

D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

E. Glazing: Comply with requirements in Division 08 Section "Glazing" and with the hollow metal door manufacturer's written instructions.

2.9 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.10 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Hollow Metal Doors:

1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicted.
3. Louvers: Factory cut openings in door and install louvers into prepared openings where indicated.
4. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
6. Electrical Raceways: Provide hollow metal doors to receive electrified hardware with concealed wiring harness and standardized Molex™ plug connectors on both ends to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through-wire transfer hardware or wiring harness specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware". Wire nut connections are not acceptable.

D. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
    a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
8. Electrical Thru-Wiring: Provide hollow metal frames receiving electrified hardware with loose wiring harness (not attached to open throat components or installed in closed mullion tubes) and standardized Molex™ plug connectors on one end to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into

the electric through-wire transfer hardware or wiring harness specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware".

9. Electrical Knock Out Boxes: Factory weld 18 gauge electrical knock out boxes to frame for electrical hardware preps; including but not limited to, electric through wire transfer hardware, electrical raceways and wiring harnesses, door position switches, electric strikes, magnetic locks, and jamb mounted card readers as specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware".
    a. Provide electrical knock out boxes with a dual 1/2-inch and 3/4-inch knockouts.
    b. Conduit to be coordinated and installed in the field (Division 26) from middle hinge box and strike box to door position box.
    c. Electrical knock out boxes to comply with NFPA requirements and fit electrical door hardware as specified in hardware sets in Division 08 Section "Door Hardware".
    d. Electrical knock out boxes for continuous hinges should be located in the center of the vertical dimension on the hinge jamb.
10. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
11. Jamb Anchors: Provide number and spacing of anchors as follows:
    a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
        1) Two anchors per jamb up to 60 inches high.
        2) Three anchors per jamb from 60 to 90 inches high.
        3) Four anchors per jamb from 90 to 120 inches high.
        4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
        1) Three anchors per jamb up to 60 inches high.
        2) Four anchors per jamb from 60 to 90 inches high.
        3) Five anchors per jamb from 90 to 96 inches high.
        4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
        5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
12. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
13. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.

E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.11 STEEL FINISHES

A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

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

3.2 PREPARATION

A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.

1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

   a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
   b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
   c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
   d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

END OF SECTION 081113

SECTION 08200 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Solid core doors with wood veneer faces.
2. Factory finishing wood doors.
3. Factory fitting wood doors to frames and factory machining for hardware.
4. Louvers installed in flush wood doors.
5. Light frames and glazing installed in wood doors.

B. Related Sections:

1. Division 06 Section "Interior Architectural Woodwork" for requirements for veneers from the same flitches for both wood doors and wood paneling.
2. Division 08 Section "Hollow Metal Doors and Frames" for wood doors in steel frames.
3. Division 08 Section "Glazing" for glass view panels in wood doors.
4. Division 08 Sections "Door Hardware" and "Access Control Hardware" for door hardware for flush wood doors and wood frames.
5. Division 28 Section "Access Control" for access control devices installed at door openings and provided as part of a security access system.

C. Standards and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A208.1 - Particleboard.
2. ASTM E90-90 - Measurement of Airborne Sound Transmission Loss of Building Partitions.
3. ASTM E 413 - Classification for Rating Sound Insulation.
4. Intertek Testing Service (ITS Warnock Hersey) - Certification Listings for Fire Doors.
5. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
6. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
7. UL 10C - Positive Pressure Fire Tests of Door Assemblies; UL 1784 - Standard for Air Leakage Tests of Door Assemblies.
8. Window and Door Manufacturers Association - WDMA I.S.1-A Architectural Wood Flush Doors.
9. Window and Door Manufacturers Association - WDMA I.S. 10 Industry Standard for Testing Cellulosic Composite Materials for Use in Fenestration Products.

1.3 SUBMITTALS

A. Product Data: For each type of door indicated. Include details of core and edge construction, louvers, trim for openings, and WDMA I.S.1-A or AWS classifications. Include factory finishing specifications.

B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the wood door supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Indicate requirements for veneer matching.
4. Indicate doors to be factory finished and finish requirements.
5. Indicate fire protection ratings for fire rated doors.

D. Samples for Initial Selection: For factory finished doors.

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.

2. Corner sections of doors, 8 by 10 inches, with door faces and edges representing actual materials to be used.

   a. Provide samples for each species of veneer and solid lumber required.
   b. Finish veneer faced door samples with same materials proposed for factory finished doors.

3. Frames for light openings, 6 inches long, for each material, type, and finish required.

E. Warranty: Sample of special warranties.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer wherever possible.

B. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, latest edition, "Industry Standard for Architectural Wood Flush Doors."

C. Fire Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40" above sill) or UL 10C (neutral pressure testing according to UL 10B where specified).

1. Oversize Fire Rated Door Assemblies: For units exceeding sizes of tested assemblies provide manufacturer's construction label, indicating compliance to independent 3rd party certification agency's procedure, except for size.

2. Temperature Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire test exposure.

3. Smoke Control Door Assemblies: Comply with NFPA 105.

    1) Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

4. Blocking: When through-bolts are not to be used, indicate size and location of blocking in 45, 60 and 90 minute mineral core doors.

D. Sound Rating Test Reports: Submit manufacturer's test results of STC ratings from testing performed by independent testing agency for sound resistant doors.

E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for receiving, handling, and installing flush wood doors.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package pre-finished doors individually in plastic bags or cardboard cartons and wrap bundles of doors in plastic sheeting.

C. Mark each door on top rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

    a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.

b. Telegraphing of core construction in wood face veneers exceeding 0.01 inch in a 3-inch span.
c. Telegraphing of core construction and delaminating of face in decorative laminate-faced doors.

2. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

3. Warranty Period for Solid Core Interior Doors: Life of installation according to manufacturer's written warranty.

PART 2 - PRODUCTS

2.1 DOOR CONSTRUCTION – GENERAL

A. WDMA I.S.1-A Performance Grade: Extra Heavy Duty; Aesthetic Grade: Premium.

B. Fire Rated Doors: Provide construction and core specified above as needed to provide fire ratings indicated.

1. Category A Edge Construction: Provide 45, 60 and 90 minute fire rated doors edge construction with intumescent seals concealed by outer stile (Category A). Comply with specified requirements for exposed edges.

2. Pairs: Provide fire retardant stiles that are listed and labeled for applications indicated without formed steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

a. Where required or specified, provide formed steel edges and astragals with intumescent seals. Finish steel edges and astragals with baked enamel.

2.2 CORE CONSTRUCTION

A. Engineered Composite Core Wood Doors:

1. Structural Composite Lumber: Engineered hardwood composite wood products tested in accordance with WDMA I.S.1A, Testing Cellulosic Composite Materials for Use in Fenestration Products containing no added Urea Formaldehyde. Comply with minimum performance levels below:

a. Screw Withdrawal, Face: 700 lbf (3100 N).
b. Screw Withdrawal, Edge: 550 lbf (2440 N).

2. Acceptable Manufacturers:

a. Algoma Hardwoods: SCLC-5
b. Graham: EC, EC5

c. Marshfield: DCL
d. VT Industries: 08

B. Mineral Core Doors:

1. Core: Non-combustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire protection rating indicated.

2. Blocking: Provide composite blocking with improved screw holding capability approved for use in doors of fire protection ratings indicated as needed to eliminate through-bolting hardware.

3. Edge Construction: At hinge stiles, provide laminated edge construction with improved screw holding capability and split resistance. Comply with specified requirements for exposed edges.

4. Acceptable Manufacturers:

a. Algoma Hardwoods: FD
b. Graham: FD45, FD60, FD90
c. Marshfield: DFP
d. VT Industries: 11

2.3 VENEERED DOORS FOR TRANSPARENT FINISH

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

1. Graham: GPD
2. Marshfield: Signature
3. VT Industries: Artistry

B. Interior Solid Core Doors:

1. Grade and Faces: Face grades as note below; veneer minimum 1/50-inch (0.5mm) thickness at moisture content of 12% or less.

a. Plain Sliced Red Oak, A grade faces.

2. Match between Veneer Leaves:

a. Book match.

3. Assembly of Veneer Leaves on Door Faces:

a. Balance match.

4. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
5. Transom Match: Continuous match.

6. Vertical Edges: Matching same species as faces. Wood or composite material, one piece, laminated, or veneered. Minimum requirements per WDMA section P-1, Performance Standards for Architectural Wood Flush Doors.
7. Horizontal Edges: Solid wood or structural composite material meeting the minimum requirements per WDMA section P-1, Performance Standards for Architectural Wood Flush Doors
8. Construction: Five plies. Stiles and rails are bonded to core, then entire unit sanded before applying face veneers.
9. At doors over 40% of the face cut-out for lights and or louvers, furnish engineered composite lumber core.

2.4 LOUVERS

A. Wood Louvers: Door manufacturer's standard solid wood louvers unless otherwise indicated.

1. Wood Species: Same species as door faces.

B. Metal Louvers: Door manufacturer's standard metal louvers unless otherwise indicated.

1. Blade Type: Vision proof inverted V or inverted Y.
2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish.

C. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.

1. Manufacturers: Subject to compliance with requirements, provide door manufacturers standard louver to meet rating indicated.
2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish.

2.5 LIGHT FRAMES AND GLAZING

A. Wood Beads for Light Openings in Wood Doors up to and including 20-minute rating:

1. Wood Species: Same species as door faces.
2. Profile: Manufacturer's standard lipped profile. At wood core doors with 20-minute fire protection ratings, provide wood beads and metal glazing clips approved for such use.

B. Metal Frames for Light Openings in Fire Rated Doors over 20-minute rating: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated.

2.6 FABRICATION

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

1. Comply with requirements in NFPA 80 for fire rated doors.

B. Factory machine doors for hardware that is not surface applied. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
2. Metal Astragals: Factory machine astragals and formed steel edges for hardware for pairs of fire rated doors.

C. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.

D. Openings: Cut and trim openings through doors in factory.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Comply with applicable requirements in Division 08 Section "Glazing."
3. Louvers: Factory install louvers in prepared openings.

E. Electrical Raceways: Provide flush wood doors receiving electrified hardware with concealed wiring harness and standardized Molex™ plug connectors on both ends to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through wire transfer hardware or wiring harness specified in hardware sets in Division 08 "Door Hardware". Wire nut connections are not acceptable.

2.7 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.

B. Transparent Finish: Provide a clear protective coating over the wood veneer allowing the natural color and grain of the selected wood species to provide the appearance specified. Stain is applied to the wood surface underneath the transparent finish to add color and design flexibility.

1. Grade: Premium.
2. Finish: Meet or exceed WDMA I.S. 1A TR6 Catalyzed Polyurethane finish performance requirements.
3. Staining: As selected by Architect from manufacturer's full range.
4. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames before hanging doors.

1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

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

3.2 INSTALLATION

A. Hardware: For installation, see Division 8 Section "Door Hardware."

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.

1. Install fire rated doors in corresponding fire rated frames according to NFPA 80.

C. Factory Fitted Doors: Align in frames for uniform clearance at each edge.

D. Factory Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Operation: Re-hang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 08361 - SECTIONAL OVERHEAD DOORS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and Shop Drawings.

PART 2 - PRODUCTS

2.1 SECTIONAL OVERHEAD DOORS

A. Standard for Sectional Doors: Comply with DASMA 102 unless otherwise indicated.

B. Structural Performance, Exterior Doors: Provide doors capable of withstanding 20 lbf/sq. ft. wind-loading pressure.

C. Panels: Galvanized steel with flat face sheets 0.064 inch thick.

1. Provide insulated panels with galvanized-steel inside faces.
2. Insulation: Polystyrene or polyurethane board insulation, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84; or glass-fiber board insulation.
3. Finish: Baked enamel or powder coat.

D. Operation: Electrical.

E. Tracks and Supports: Galvanized steel, sized for door size and weight.

F. Hardware: Provide heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless-steel, or other corrosion-resistant fasteners, to suit door type.

G. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

H. Obstruction Detection Device: Equip motorized door with external automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.

I. Radio Control: Opens, closes, and stops door; one per operator.

PART 3 - EXECUTION

3.1 INSTALLATION

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

B. Accessibility: Install sectional doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

C. Fasten vertical track assembly to framing at not less than 24 inches o.c. Hang horizontal track from structural overhead framing with angle or channel hangers. Provide bracing and reinforcement as required for rigid installation of track and door.

D. Lubricate bearings and sliding parts; adjust doors to operate easily, free of warp, twist, or distortion and fitting weathertight for entire perimeter.

E. Test and adjust controls and safeties.

END OF SECTION 08361

SECTION 08520 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes fixed windows.

B. See Division 8 Section "Glazing" for glazing requirements for aluminum windows, including those specified to be factory glazed.

1.2 PERFORMANCE REQUIREMENTS

A. General: Provide aluminum windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified and that are of minimum test size required by AAMA/NWWDA 101/I.S.2.

B. Structural Performance: Provide aluminum windows capable of withstanding the following, including wind loads based on passing AAMA/NWWDA 101/I.S.2, Uniform Load Structural Test, at basic wind speed indicated:

1. Deflection: Based on passing AAMA/NWWDA 101/I.S.2, Uniform Load Deflection Test or on glass framing system designed to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 3/4 inch, whichever is less, at design pressure based on structural computations.
2. Basic Wind Speed: As indicated in miles per hour at 33 feet above grade. Determine wind loads and resulting design pressures applicable to Project according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures," Section 6.4.2, "Analytic Procedure"; based on mean roof heights above grade as indicated on Drawings.

C. Air Infiltration: Maximum as recommended by manufacturer when tested according to AAMA/NWWDA 101/I.S.2, Air Infiltration Test.

D. Water Resistance: No water leakage as defined in AAMA/NWWDA referenced test methods at a water test pressure equaling when tested according to AAMA/NWWDA 101/I.S.2, Water Resistance Test.

E. Forced-Entry Resistance: Comply with Performance Level 10 requirements when tested according to ASTM F 588.

F. Condensation-Resistance Factor: Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a CRF of 45, where windows are indicated to be "thermally improved."

G. Thermal Transmittance: Provide aluminum windows with a whole-window U-value maximum at 15-mph per AAMA 1503

H. Thermal Movements: Provide aluminum windows, including anchorage, that accommodate thermal movements of units resulting from the following maximum change (range) in ambient and surface temperatures without buckling, distortion, opening of joints, failure of joint sealants, damaging loads and stresses on glazing and connections, and other detrimental effects. Base engineering calculation on actual surface temperatures of materials due to solar heat gain and nighttime-sky heat loss.

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

I. Life-Cycle Testing: Test according to AAMA 910 and comply with AAMA/NWWDA 101/I.S.2 .

J. Specific Product Performance Requirements: Comply with Section 2.2 of AAMA/NWWDA 101/I.S.2 as applicable to types of aluminum windows indicated.

1.3 SUBMITTALS

A. Product Data: For each type of aluminum window indicated.

B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other Work, and operational clearances.

1. Include structural analysis data indicating structural test pressures and design pressures from basic wind speeds indicated and deflection limitations of glass framing systems, signed and sealed by the qualified professional engineer responsible for their preparation.

C. Samples: For each exposed finish.

D. Field quality-control test reports.

E. Product test reports.

F. Maintenance data.

1.4 QUALITY ASSURANCE

A. Installer: A qualified installer, approved by manufacturer to install manufacturer's products.

B. Fenestration Standard: Comply with AAMA/NWWDA 101/I.S.2, "Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors," for minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

C. Glazing Publications: Comply with published recommendations of glass manufacturers and GANA's "Glazing Manual" unless more stringent requirements are indicated.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace aluminum windows that fail in materials and workmanship within five years from date of Substantial Completion.

B. Warranty Period for Metal Finishes: 10 years from date of Substantial Completion.

C. Warranty Period for Glass: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

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

1. Acorn Window Systems.
2. All Seasons Commercial Division, Inc.
3. Boyd Aluminum Manufacturing.
4. Custom Window Company.
5. DeSCo Windows.
6. EFCO Corporation.
7. EXTECH/Exterior Technologies, Inc.
8. Fleetwood Aluminum Products, Inc.
9. Graham Architectural Products Corp.
10. Kawneer Company, Inc.
11. Mannix; a Division of Interstate Window Corp.
12. Manco Window Systems
13. Peerless Products, Inc.
14. Reynolds Architectural Systems; Ramco Mfg. Co.
15. Thermal Windows, Inc.
16. TRACO.
17. Winco Manufacturing Co.
18. Window Technologies, Inc.
19. YKK AP America Inc.

2.2 GLAZING

A. Glass and Glazing Materials: Refer to Division 8 Section "Glazing" for glass units and glazing requirements applicable to glazed aluminum window units.

B. Glass: Tinted, insulating-glass complying with Division 8 Section "Glazing."

C. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

2.3 FABRICATION

A. General: Fabricate aluminum windows, in sizes indicated, that comply with requirements and that meet or exceed AAMA/NWWDA 101/I.S.2 performance requirements for the following window type and performance class. Include a complete system for assembling components and anchoring windows.
1. Fixed Windows: C.

B. Fabricate aluminum windows that are reglazable without dismantling sash or ventilator framing.

C. Weather Stripping: Provide full-perimeter weather stripping for each operable sash and ventilator.

D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.

E. Provide water-shed members above side-hinged ventilators and similar lines of natural water penetration.

F. Mullions: Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units.

G. Subframes: Provide subframes with anchors for window units as shown, of profile and dimensions indicated but not less than 0.062-inch-thick extruded aluminum. Miter or cope corners, and weld and dress smooth with concealed mechanical joint fasteners. Finish to match window units. Provide subframes capable of withstanding design loads of window units.

H. Glazing Stops: Provide snap-on glazing stops coordinated with Division 8 Section "Glazing" and glazing system indicated. Provide glazing stops to match sash and ventilator frames.

I. Muntins: Provide 1" external applied muntins with finish to match the window.

2.4 FINISHES

A. Aluminum Anodic Finish: Class I, color anodic coating complying with AAMA 611.

1. Color: As selected from full range of industry colors and densities.

2.5 INSTALLATION

A. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

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

C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

D. Metal Protection: Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified in "Dissimilar Materials" Paragraph in Appendix B in AAMA/NWWDA 101/I.S.2.

E. Adjust operating sashes and ventilators, screens, and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

F. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.

G. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

H. Clean factory-glazed glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels and clean surfaces.

I. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 08520

SECTION 08710 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes: Finish Hardware for door openings, except as otherwise specified herein.
   1. Door hardware for aluminum doors.
   2. Door hardware for wood doors.

B. Intent of Hardware Groups
   1. Should items of hardware not definitely specified be required for completion of the Work, furnish such items of type and quality comparable to adjacent hardware and appropriate for service required.
   2. Where items of hardware aren't definitely or correctly specified, are required for completion of the Work, a written statement of such omission, error, or other discrepancy to Architect, prior to date specified for receipt of bids for clarification by addendum; or, furnish such items in the type and quality established by this specification, and appropriate to the service intended.

C. Allowances
   1. Refer to Division 1 for allowance amount and procedures.

D. Alternates
   1. Refer to Division 1 for Alternates and procedures.

1.2 SUBSTITUTIONS:

A. Comply with Division 1

1.3 SUBMITTALS:

A. Comply with Division 1

B. Special Submittal Requirements: Combine submittals of this Section with Sections listed below to ensure the "design intent" of the system/assembly is understood and can be reviewed together.

C. Product Data: Manufacturer's specifications and technical data including the following:
   1. Detailed specification of construction and fabrication.
   2. Manufacturer's installation instructions.
   3. Submit 6 copies of catalog cuts with hardware schedule.

D. Shop Drawings - Hardware Schedule: Submit 6 complete reproducible copy of detailed hardware schedule in a vertical format.
   1. List groups and suffixes in proper sequence.
   2. Completely describe door and list architectural door number.
   3. Manufacturer, product name, and catalog number.
   4. Function, type, and style.
   5. Size and finish of each item.
   6. Mounting heights.
   7. Explanation of abbreviations and symbols used within schedule.
   8. Detailed wiring diagrams and risers, specially developed for each opening, indicating all electric hardware, security equipment and access control equipment, and door and frame rough-ins required for specific opening.

E. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.
   1. Templates, wiring diagrams and "reviewed Hardware Schedule" of electrical terms to electrical and security vendor for coordination and verification of voltages and

F. Contract Closeout Submittals: Comply with Division 1 including specific requirements indicated.
   1. Operating and maintenance manuals: Submit 3 sets containing the following.
      a. Complete information in care, maintenance, and adjustment, and data on repair and replacement parts, and information on preservation of finishes.
      b. Catalog pages for each product.
      c. Name, address, and phone number of local representative for each manufacturer.
      d. Parts list for each product.
      e. Manufacturers Installation Instructions
   2. Copy of final hardware schedule, edited to reflect, "As installed".
   3. Copy of final keying schedule
   4. One set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

1.4 QUALITY ASSURANCE

A. Comply with Division 1
   1. Installer's Qualifications: Firm with 3 years experience in installation of similar hardware to that required for this Project, including specific requirements indicated.
   2. Regulatory Label Requirements: Provide testing agency label or stamp on hardware for labeled openings.
      a. Provide UL listed hardware for labeled and 20-minute openings in conformance with requirements for class of opening scheduled.
      b. Underwriters Laboratories requirements have precedence over this specification where conflicts exist.
   3. Single Source Responsibility: Except where specified in hardware schedule, furnish products of only one manufacturer for each type of hardware.

B. Review Project for extent of finish hardware required completing the Work. Where there is a conflict between these Specifications and the existing hardware, notify the Architect in writing and furnish hardware in compliance with the Specification unless otherwise directed in writing by the Architect.

C. Pre-Installation Meetings: Initiate and conduct with supplier, installer and related trades, coordinate materials and techniques, and sequence complex hardware items and systems installation. Convene at least one week prior to commencement of related work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping: Comply with Division 1
1. Deliver products in original unopened packaging with legible manufacturer's identification.
2. Package hardware to prevent damage during transit and storage.
3. Mark hardware to correspond with "reviewed hardware schedule".
4. Deliver hardware to door and frame manufacturer upon request.

B. Storage and Protection: Comply with manufacturer's recommendations.

1.6 PROJECT CONDITIONS

A. Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.

B. Review Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

1.7 WARRANTY:

A. Refer to Conditions of the Contract

B. Manufacturer's Warranty:
1. Closers: Ten years
   a. Exit Devices: Three Years
2. Locksets & Cylinders: Three years
   a. All other Hardware: Two years.

1.8 OWNERS INSTRUCTION:

A. Instruct Owner's personnel in operation and maintenance of hardware units.

1.9 MAINTENANCE:

A. Extra Service Materials: Deliver to Owner extra service materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals Section.
   1. Special Tools: Provide special wrenches and tools applicable to each different or special hardware component.
   2. Maintenance Tools: Provide maintenance tools and accessories supplied by hardware component manufacturer.
   3. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra materials.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. The following manufacturers are approved subject to compliance with requirements of the Contract Documents. Approval of manufacturers other than those listed shall be in accordance with Division 1.

Item:	Manufacturer:Approved:
Hinges	Stanley, Hager, McKinney
Locksets & Cylinders	Schlage, Yale
Pulls	Rockwood, Trimco
Closers	Stanley, LCN
Stops	Rockwood, Trimco
Flatgoods	Rockwood, Trimco
Thresholds & Gasketing	National Guard, Reese

2.2 MATERIALS:

A. Hinges:
   1. Template screw hole locations
   2. Sufficient size to allow 180-degree swing of door
   3. Provide hinge type as listed in schedule.
   4. Furnish 3 hinges per leaf to 7 foot 6 inch height. Add one for each additional 30 inches in height or fraction thereof.

5. Tested and approved by BHMA for all applicable ANSI Standards for type, size, function and finish
6. UL10C listed for Fire

B. Cylindrical Type Locks and Latchsets:
1. Tested and approved by ANSI 156.2, 1996, Series 4000, Grade 2. (Formerly FF-H-106C Series 160.) UL Listed for all functions up to 3 hours
2. Fit modified ANSI A115.2 door preparation
3. 2-3/4 inch (70mm) backset or as required to center lockset on stile and rail doors.
4. Core face must be the same finish as the lockset
5. Functions and design as indicated in the hardware groups

C. Cylinders:
1. Provide necessary cylinder housings, collars, rings, & springs as recommended by manufacturer for proper installation.
   a. Provide proper cylinder cams as required to operate locksets.
   b. Coordinate and provide as required for related sections.

D. Door Closers shall:
1. Tested and approved by BHMA for ANSI 156.4, Grade 1
2. UL10C certified
3. Closer shall have extra-duty arms and knuckles
4. Conform to ANSI 117.1
5. Maximum 2 7/16 inch case projection with non-ferrous cover
6. Separate adjusting valves for closing and latching speed, and backcheck
7. Provide adapter plates, shim spacers and blade stop spacers as required by frame and door conditions
8. Full rack and pinion type closer with 1½" minimum bore
9. Mount closers on non-public side of door, unless otherwise noted in specification
10. Closers shall be non-handed, non-sized and multi-sized 1 through 6

E. Kickplates: Provide with four beveled edges, 8 inches high by width less 2 inches on single doors and 1 inch on pairs of doors. Furnish pan-head countersunk screws to match finish.

F. Seals: All seals shall be finished to match adjacent frame color. Seals shall be furnished as listed in schedule. Material shall be UL listed for labeled openings.

G. Thresholds: As specified and per details. Maximum height of ½" at ADA required openings. Coordinate with door bottom and door undercut.

H. Silencers: Furnish silencers on all interior frames, 3 for single doors, 2 for pairs. Omit where any type of seals occur.

2.3 FINISH:

A. Designations used in Schedule of Finish Hardware - 3.5, and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products

B. Powder coat door closers to match other hardware, unless otherwise noted.

C. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.

2.4 KEYS AND KEYING:

A. Furnish keys in the following quantities:

4 each Masterkeys
3 each Change keys each keyed core

B. Keying Schedule: Arrange for a keying meeting, and programming meeting with Architect Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying and programming complies with project requirements. Furnish 3 typed copies of keying and programming schedule to Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of conditions: Examine doors, frames, related items and conditions under which Work is to be performed and identify conditions detrimental to proper and or timely completion.
1. Do not proceed until unsatisfactory conditions have been corrected.

3.2 HARDWARE LOCATIONS:

A. Mount hardware units at heights indicated in the following publications except as specifically indicated or required to comply with the governing regulations.
1. Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames, by the Door and Hardware Institute (DHI).
2. NWWDA Industry Standard I.S.1.7, Hardware Locations for Wood Flush Doors.

3.3 INSTALLATION:

A. Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

B. Conform to local governing agency security ordinance.

C. ADA Standard: Conform to ANSI A117.1 for positioning requirements for disabled.

D. Install hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use "Riv-Nuts" or similar products.

1. Closers: Coordinate installation of closer for maximum degree of hold open or opening with actual degree of swing.
2. Locksets: Provide appropriate backset to center lockset on stile and rail type doors.
3. Thresholds: Set thresholds for exterior doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants." Securely and permanently anchor exterior thresholds using countersunk non-ferrous screws to match color of threshold. Stainless steel screws at aluminum thresholds.

E. Mount cylinder keyways in proper position as recommended by manufacturers.

F. Gaskets: install jamb-applied gaskets before closers, overhead stops, rim strikes, etc; fasten hardware over and through stop applied gaskets providing an uninterrupted seal where possible. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.

G. Replace fasteners damaged by power-driven tools.

3.4 FIELD QUALITY CONTROL AND FINAL ADJUSTMENT:

A. Contractor/Installer Field Services: After installation is complete, Contractor shall inspect completed door openings on site to verify installation of hardware is complete and properly adjusted. Compensate for final operation of heating and ventilating equipment.
   1. Check and adjust closers to ensure proper operation.
      a. Adjust closer to complete full closing cycle in less than 4 to 6 seconds without abrupt change of speed between "Sweep" and "Latch" speeds.
      b. Adjust "Backcheck" according to manufacturer's instructions.
      c. Set exterior doors closers to have 5 lbs maximum pressure to open, interior non-rated at 5 lbs, rated openings at 12lbs
   2. Check latchset, lockset, and exit devices are properly installed and adjusted to ensure proper operation.
      a. Verify levers are free from binding.
      b. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.
   3. Report findings, in writing, to the Architect and Hardware Supplier outlining corrective actions and recommendations.

3.1 SCHEDULE OF FINISH HARDWARE:

B. See drawings

END OF SECTION 08710

SECTION 08800 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
   1. Doors.
   2. Storefront framing.

1.2 DEFINITIONS

A. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

B. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

C. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:

   1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
      a. Specified Design Wind Loads: Not less than wind loads applicable to Project as required by ASCE 7 "Minimum Design Loads for Buildings and Other Structures": Section 6.0 "Wind Loads."

b. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.

1) Load Duration: 3 seconds.

c. Minimum Glass Thickness for Exterior Lites: Not less than 1"
d. Thickness of Tinted and Heat-Absorbing Glass: Provide the same thickness for each tint color indicated throughout Project.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

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

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites of thickness indicated.
2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite 1inch thick and a nominal wide interspace.
3. Center-of-Glass Values: Based on using LBL-44789 WINDOW 5.0 computer program for the following methodologies:

a. U-Factors: NFRC 100 expressed as Btu/ sq. ft. x h x deg F.
b. Solar Heat Gain Coefficient: NFRC 200.
c. Solar Optical Properties: NFRC 300.

1.4 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glazing Schedule: Use same designations indicated on Drawings for glazed openings.

C. Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer.

1.5 QUALITY ASSURANCE

A. Glazing for Fire-Rated Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 257.

B. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201

C. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: GANA Laminated Division's "Laminated Glass Design Guide" and GANA's "Glazing Manual."
2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."

D. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:

1. Insulating Glass Certification Council.
2. Associated Laboratories, Inc.

1.6 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form, made out to Owner and signed by coated-glass manufacturer agreeing to replace coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

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

2.2 GLASS PRODUCTS

A. Float Glass: ASTM C 1048 or 1036, Type I (transparent flat glass), Quality-Q3; of class,kind, and condition indicated.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.

3. For uncoated glass, comply with requirements for Condition A.
4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).

5. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is indicated.

B. Insulating-Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.

1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
2. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
3. Sealing System: Dual seal.
4. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:

   a. Spacer Material: Aluminum with black, color anodic finish.
   b. Corner Construction: Manufacturer's standard corner construction.

2.3 FIRE-RATED GLAZING PRODUCTS

A. Fire-Protection Rating: As indicated for the assembly in which glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.

2.4 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:

1. Neoprene, ASTM C 864.
2. EPDM, ASTM C 864.
3. Silicone, ASTM C 1115.
4. Thermoplastic polyolefin rubber, ASTM C 1115.
5. Any material indicated above.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:

1. Neoprene.
2. EPDM.

3. Silicone.
4. Thermoplastic polyolefin rubber.
5. Any material indicated above.

2.5 GLAZING SEALANTS

A. General: Provide products of type indicated, complying with the following requirements:

1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Elastomeric Glazing Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

C. Glazing Sealants for Fire-Resistive Glazing Products: Identical to products used in test assemblies to obtain fire-protection rating.

2.6 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:

1. Type 1, for glazing applications in which tape acts as the primary sealant.
2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.7 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistance rating.

2.8 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

2.9 INTERIOR FLOAT-GLASS UNITS

A. Uncoated Clear Float-Glass Units : Class 1 (clear) annealed or Kind HS (heat-strengthened) float glass where heat strengthening is required to resist thermal stresses induced by differential shading of individual glass lites and to comply with system performance requirements.

2.10 EXTERIOR INSULATING-GLASS UNITS

A. Low-E Insulating-Glass Units:

1. Overall Unit Thickness of Each Lite: 1 inch.
2. Interspace content: Air
3. Outdoor Lite: Class 2 (tinted) float glass.

    a. Tint Color: smoke gray
    b. Annealed or Kind HS (heat strengthened).

4. Loe-E Coating or film: Pyrolytic or sputtered on second surface or low-e-coated film suspended in the interspace.
5. Visible Light Transmittance: 0.58
6. U-Factor: 0.31

7. Solar Heat Gain Coefficient: 0.34.

PART 3 - EXECUTION

3.1 GLAZING

A. General: Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

1. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
2. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
3. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
4. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
5. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
6. Provide spacers for glass lites where length plus width is larger than 50 inches.
7. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

B. Tape Glazing: Position tapes on fixed stops so that when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

1. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
2. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
3. Apply heel bead of elastomeric sealant.
4. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
5. Apply cap bead of elastomeric sealant over exposed edge of tape.

C. GASKET GLAZING (DRY) Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

1. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
2. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
3. Install gaskets so they protrude past face of glazing stops.

3.2 SEALANT GLAZING (WET): Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

1. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
2. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.3 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended by glass manufacturer.

B. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

END OF SECTION 08800

SECTION 09250 - 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.

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, 5/8" thick Type X, with manufacturer's standard edges.

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.

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

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

1. Joint Tape: Paper unless otherwise recommended by panel manufacturer.
2. Embedding and first coat: Use setting-type compounds.
3. Fill Coat: For second coat, use drying-type compound.
4. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

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.

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

C. Finishing Gypsum Board: ASTM C 840.
1. 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.

END OF SECTION 09250

SECTION 09511 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data and material Samples.

B. Surface-Burning Characteristics of Panels: ASTM E 1264, Class A materials, tested per ASTM E 84.

C. 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.

D. Seismic Standard: Provide acoustical panel ceilings designed and installed to withstand the effects of earthquake motions according to the following:

1. CISCA's Recommendations for Acoustical Ceilings: Comply with CISCA's "Recommendations for Direct-Hung Acoustical Tile and Lay-in Panel Ceilings.
2. International Building Code, Section 1621.

PART 2 - PRODUCTS

2.1 ACOUSTICAL PANELS

A. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

B. Classification: As follows, per ASTM E 1264:

1. Type and Form: Type III, Form 2.
2. Pattern: C D
3. Color: White.
4. Fire Class A

C. Edge Detail: Angled Tegular

D. Thickness: 5/8 inch.

E. Size: 24 inch x 24 inch

2.2 CEILING SUSPENSION SYSTEM

A. Components: Main beams and cross tees in accordance with the International Building Code, Section 1621 for Category D, E and F as described in ESR-1308.
   1. Structural Classification: ASTM C 635, Heavy Duty.
   2. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.

B. Attachment Devices: In accordance with the International Building Code, Section 1621 for Category D, E, and F.

C. Wire for Hangers and Ties: In accordance with the International Building Code, Section 1621.

D. Wall Moldings: In accordance with the International Building Code, Section 1621 for Category D, E. and F or method as described in ESR-1308.
   1. Nominal 15/16 inch x 15/16 inch hemmed, pre-finished angle molding (7809)

E. Accessories:
   1. 2 inch Beam End Retaining Clip, 0.034 inch thick, hot-dipped galvanized cold-rolled steel per ASTM A568 – used to join main beam or cross tee to wall molding.
   2. Seismic Joint Clip, 5 inches x 1-1/2 inch, hot-dipped galvanized cold-rolled steel per ASTM A568. The two piece unit is designed to accommodate a seismic separation joint.

PART 3 - EXECUTION

3.1 INSTALLATON (Category D,E,F)

A. A.Install suspension system and panels in accordance with the International Building Code, Section 1621.

B. The presence of a hanger wire within 3 inches of an expansion relief joint as called for in ASTM C636 shall be required in addition to the requirements of the International Building Code, Section 1621.2.5 and with the authorities having jurisdiction.

C. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.

D. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

END OF SECTION 09511

SECTION 09651 - RESILIENT FLOOR TILE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Vinyl composition tile (VCT).

1.2 SUBMITTALS

A. Product Data: For each product indicated.

1.3 PROJECT CONDITIONS

A. Maintain temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F , in spaces to receive floor tile during the following time periods:

   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

B. After post-installation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Close spaces to traffic during floor covering installation.

D. Close spaces to traffic for 48 hours after floor covering installation.

E. Install resilient products after other finishing operations, including painting, have been completed.

1.4 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

   1. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

PART 2 - PRODUCTS

2.1 VINYL COMPOSITION TILE

A. Vinyl Composition Tile (VCT): ASTM F 1066.

B. Color and Pattern: One color, as selected from manufacturer's standard colors.

C. Class: 3 (surface-pattern tile).

D. Wearing Surface: Smooth.

E. Thickness: 0.125 inch.

F. Size: 12 by 12 inches.

G. Fire-Test-Response Characteristics:

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.

2.2 INSTALLATION MATERIALS

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

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

C. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of tiles, and in maximum available lengths to minimize running joints.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
3. Moisture Testing:

a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
b. Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

C. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.

E. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

1. Do not install resilient products until they are same temperature as space where they are to be installed.

F. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FLOOR TILE INSTALLATION

A. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles square with room axis.

B. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern.

C. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.

D. Extend tiles into toe spaces, door reveals, closets, and similar openings.

E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.

F. Install tiles on covers for telephone and electrical ducts and similar items in finished floor areas. Maintain overall continuity of color and pattern with pieces of tile installed on covers. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

G. Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

H. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

    a. Do not wash surfaces until after time period recommended by manufacturer.

I. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

3.3 COURT MARKINGS INSTALLATION

A. Layout 2" wide court markings for gymnasium basketball court and volleyball court in accordance with the current rules of the Missouri State High School Athletic Association.

END OF SECTION 09651

SECTION 09680 - CARPET

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes tufted carpet.

1.2 SUBMITTALS

A. Product Data: For each product indicated.

B. Shop Drawings: Include the following:
   1. Transition, and other accessory strips.
   2. Transition details to other flooring materials.

C. Samples: For each for each carpet and exposed accessory and for each color and pattern required.

D. Product Schedule: Use same room and product designations indicated on Drawings and in schedules.

E. Maintenance data.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104, Section 5, "Storage and Handling."

1.5 PROJECT CONDITIONS

A. General: Comply with CRI 104, Section 6.1, "Site Conditions; Temperature and Humidity."

B. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

C. Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet, install carpet tile before installing these items.

1.6 WARRANTY

A. Carpet Warranty: Manufacturer's standard form in which manufacturer agrees to replace carpet that does not comply with requirements or that fails within 10 years from date of Substantial Completion. Warranty does not include deterioration or failure of carpet from unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, and delamination.

PART 2 - PRODUCTS

2.1 CARPET

A. Products: Any substitutions must meet or exceed those requirements specified under all sections of this document as well as be approved in pattern, color, and fiber by the architect. Otherwise, provide the following:

1. Field carpet: Bigelow Commercial: Accountable II Modular

a. Color and Pattern: As selected from full range of options

B. Primary and Secondary Backing: High Performance / Manufacturer's recommended.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with CRI 104, Section 8, "Direct Glue-Down." or 9, "Double Glue-Down.

B. Maintain uniformity of carpet direction and lay of pile. At doorways, center seams under door in closed position. Bind or seal cut edges as recommended by carpet manufacturer. Seams to run the length of the area. Main traffic runs along, rather than across, the seam. Seams are away from area subject to pivoting traffic. Seams are not perpendicular to doorway openings.

END OF SECTION 09680

SECTION 09912 - PAINTING (PROFESSIONAL LINE PRODUCTS)

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes surface preparation and field painting of exposed exterior and interior items and surfaces.

1.2 SUBMITTALS

A. Product Data: For each paint system indicated. .

B. Samples for Initial Selection: For each type of finish-coat material indicated.

1.3 QUALITY ASSURANCE

A. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample for each type of coating and substrate required. Comply with procedures specified in PDCA P5. Duplicate finish of approved sample Submittals.

1. Wall Surfaces: Provide samples on at least 10 sq. ft.
2. Small Areas and Items: Architect will designate items or areas required.
3. Revise below if Architect reserves the right to make final color selection from benchmark samples.
4. Final approval of colors will be from benchmark samples.

1.4 PROJECT CONDITIONS

A. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F.

B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F.

C. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

B. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

C. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Benjamin Moore & Co. (Benjamin Moore).
2. M. A. Bruder & Sons, Inc. (M. A. B. Paint).
3. PPG Industries, Inc. (Pittsburgh Paints).
4. Sherwin-Williams Co. (Sherwin-Williams).
5. Others as approved.

2.2 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

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

2.3 PREPARATORY COATS

A. Exterior Primer: Exterior alkyd or latex-based primer of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.

1. Ferrous-Metal and Aluminum Substrates: Rust-inhibitive metal primer
2. Zinc-Coated Metal Substrates: Galvanized metal primer.
3. Where manufacturer does not recommend a separate primer formulation on substrate indicated, use paint specified for finish coat.

B. Interior Primer: Interior latex-based or alkyd primer of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.

1. Ferrous-Metal Substrates: Quick drying, rust-inhibitive metal primer
2. Zinc-Coated Metal Substrates: Galvanized metal primer.

3. Where manufacturer does not recommend a separate primer formulation on substrate indicated, use paint specified for finish coat.

C. Interior Gypsum Board Primer: Factory-formulated latex-based primer for interior application.
1. Benjamin Moore; Moorcraft Super Spec Latex Enamel Undercoater & Primer Sealer No. 253: Applied at a dry film thickness of not less than 1.2 mils .
2. M. A. B. Paint; Fresh Kote Vinyl Primer 037-100: Applied at a dry film thickness of not less than 1.5 mils.
3. Pittsburgh Paints; 6-2 SpeedHide Interior Quick-Drying Latex Sealer: Applied at a dry film thickness of not less than 1.0 mil.
4. Sherwin-Williams; PrepRite 200 Latex Wall Primer B28W200 Series: Applied at a dry film thickness of not less than 1.6 mils.
5. Others as approved by Architect.

2.4 EXTERIOR FINISH COATS

A. Exterior Semigloss Acrylic Enamel: Factory-formulated semigloss waterborne acrylic-latex enamel for exterior application.
1. Benjamin Moore; Moorcraft Super Spec Latex House & Trim Paint No. 170: Applied at a dry film thickness of not less than 1.1 mils .
2. M. A. B. Paint; Sea Shore/Four Seasons Acrylic Latex Trim Enamel 024 Line: Applied at a dry film thickness of not less than 1.5 mils.
3. Pittsburgh Paints; 6-900 Series SpeedHide Exterior House & Trim Semi-Gloss Acrylic Latex Paint: Applied at a dry film thickness of not less than 1.5 mils.
4. Sherwin-Williams; A-100 Latex Gloss A8 Series.
5. Others as approved by Architect.

2.5 INTERIOR FINISH COATS

A. Interior Low-Luster Acrylic Enamel: Factory-formulated eggshell acrylic-latex interior enamel.
1. Benjamin Moore; Moorcraft Super Spec Latex Eggshell Enamel No. 274: Applied at a dry film thickness of not less than 1.3 mils.
2. M. A. B. Paint; Fresh Kote Latex Satin Eggshell Enamel 405 Line: Applied at a dry film thickness of not less than 1.5 mils.
3. Pittsburgh Paints; 6-400 Series SpeedHide Eggshell Acrylic Latex Enamel: Applied at a dry film thickness of not less than 1.25 mils.
4. Sherwin-Williams; ProMar 200 Interior Latex Egg-Shell Enamel B20W200 Series: Applied at a dry film thickness of not less than 1.6 mils.
5. Others as approved by Architect.

B. Interior Semigloss Acrylic Enamel: Factory-formulated semigloss acrylic-latex enamel for interior application.

1. Benjamin Moore; Moorcraft Super Spec Latex Semi-Gloss Enamel No. 276: Applied at a dry film thickness of not less than 1.2 mils.
2. M. A. B. Paint; Fresh Kote Latex Semi-Gloss 410 Line: Applied at a dry film thickness of not less than 1.5 mils.
3. Pittsburgh Paints; 6-500 Series SpeedHide Interior Semi-Gloss Latex: Applied at a dry film thickness of not less than 1.0 mil.

4. Sherwin-Williams; ProMar 200 Interior Latex Semi-Gloss Enamel B31W200 Series: Applied at a dry film thickness of not less than 1.3 mils.
5. Others as approved by Architect.

C. Interior Full-Gloss Acrylic Enamel: Factory-formulated full-gloss acrylic-latex interior enamel.
1. Benjamin Moore; Moore's IMC Acrylic Gloss Enamel No. M28: Applied at a dry film thickness of not less than 2.0 mils.
2. M. A. B. Paint; Rich Lux Architectural High Gloss Latex Enamel 022-127 Line: Applied at a dry film thickness of not less than 1.5 mils.
3. Pittsburgh Paints; 6-8534 SpeedHide Interior Latex 100 Percent Acrylic Gloss Enamels: Applied at a dry film thickness of not less than 1.0 mil.
4. Pittsburgh Paints; 90-374 Pitt-Tech One Pack Interior/Exterior High Performance Waterborne High Gloss DTM Industrial Enamel: Applied at a dry film thickness of not less than 3.0 mils.
5. Sherwin-Williams; ProMar 200 Interior Latex Gloss Enamel B21W201: Applied at a dry film thickness of not less than 1.5 mils.
6. Others as approved by Architect.

2.6 INTERIOR WOOD STAINS AND VARNISHES

A. Open-Grain Wood Filler: Factory-formulated paste wood filler applied at spreading rate recommended by manufacturer.
1. Benjamin Moore; Benwood Paste Wood Filler No. 238.
2. M. A. B. Paint; Paste Wood Filler.
3. Pittsburgh Paints; none required.
4. Sherwin-Williams; Sher-Wood Fast-Dry Filler.
5. Others as approved by Architect.

B. Interior Wood Stain: Factory-formulated alkyd-based penetrating wood stain for interior application applied at spreading rate recommended by manufacturer.
1. Benjamin Moore; Benwood Penetrating Stain No. 234.
2. M. A. B. Paint; Wood Stain 062 Line.
3. Pittsburgh Paints; 77-560 Rez Interior Semi-Transparent Oil Stain.
4. Sherwin-Williams; Wood Classics Interior Oil Stain A-48 Series.
5. Others as approved by Architect.

C. Clear Sanding Sealer: Factory-formulated fast-drying alkyd-based clear wood sealer applied at spreading rate recommended by manufacturer.
1. Benjamin Moore; Moore's Interior Wood Finishes Quick-Dry Sanding Sealer No. 413.
2. M. A. B. Paint; Minit Dri Sanding Sealer 037-005 Line.
3. Pittsburgh Paints; 6-10 SpeedHide Quick-Drying Interior Sanding Wood Sealer and Finish.
4. Sherwin-Williams; Wood Classics Fast Dry Sanding Sealer B26V43.
5. Others as approved by Architect.

D. Interior Alkyd- or Polyurethane-Based Clear Satin Varnish: Factory-formulated alkyd- or polyurethane-based clear varnish.
1. Benjamin Moore; Benwood Interior Wood Finishes Polyurethane Finishes Low Lustre No. 435.

2. M. A. B. Paint; Rich Lux Water Based Satin Polyurethane.
3. Pittsburgh Paints; 77-7 Rez Varnish, Interior Satin Oil Clear.
4. Sherwin-Williams; Wood Classics Fast Dry Oil Varnish, Satin A66-300 Series.
5. Others as approved by Architect.

E. Interior Waterborne Clear Satin Varnish: Factory-formulated clear satin acrylic-based polyurethane varnish applied at spreading rate recommended by manufacturer.
1. Benjamin Moore; Stays Clear Acrylic Polyurethane No. 423, Satin.
2. M. A. B. Paint; Rich Lux Water Based Satin Polyurethane 088-900s.
3. Pittsburgh Paints; 77-49 Rez Satin Acrylic Clear Polyurethane.
4. Sherwin-Williams; Wood Classics Waterborne Polyurethane Satin, A68 Series.
5. Others as approved by Architect.

F. Interior Waterborne Clear Gloss Varnish: Factory-formulated clear gloss acrylic-based polyurethane varnish applied at spreading rate recommended by manufacturer.
1. Benjamin Moore; Benwood Interior Wood Finishes Polyurethane Finishes High Gloss No. 428.
2. M. A. B. Paint; Rich Lux Water Based Gloss Polyurethane 088-899 Line.
3. Pittsburgh Paints; 77-45 Rez Full-Gloss Acrylic Clear Polyurethane.
4. Sherwin-Williams; Wood Classics Waterborne Polyurethane Gloss, A68 Series.
5. Others as approved by Architect.

G. Paste Wax: As recommended by manufacturer.

PART 3 - EXECUTION

3.1 APPLICATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

C. Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

D. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime.

2. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.

    a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.

    b. Apply two coats of stain and two coats of polyurethane

3. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.

4. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

E. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.

F. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

G. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
2. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
3. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
4. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
5. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
6. Sand lightly between each succeeding enamel or varnish coat.

H. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. Omit primer over metal surfaces that have been shop primed and touchup painted.

2. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
3. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

I. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

J. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.

K. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.

L. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

M. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

N. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.

1. Provide satin finish for final coats.

O. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.

3.2 CLEANING

A. At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

B. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

C. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.3 EXTERIOR PAINT SCHEDULE

A. Ferrous Metal: Provide the following finish systems over exterior ferrous metal. Primer is not required on shop-primed items.

1. Full-Gloss Alkyd-Enamel Finish: Two finish coats over a rust-inhibitive primer.

a. Primer: Exterior ferrous-metal primer.
b. Finish Coats: Exterior full-gloss alkyd enamel.

3.4 INTERIOR PAINT SCHEDULE

A. Concrete and Masonry (Other Than Concrete Unit Masonry): Provide the following paint systems over interior concrete and brick masonry substrates:

1. Semigloss Alkyd-Enamel Finish: Two finish coats over a primer.

a. Primer: Interior concrete and masonry primer.
b. Finish Coats: Interior semigloss alkyd enamel.

B. Concrete Unit Masonry: Provide the following finish systems over interior concrete masonry:

1. Flat Acrylic Finish: Two finish coats over a block filler.

a. Block Filler: Concrete unit masonry block filler.
b. Finish Coats: Interior flat acrylic paint.

C. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces:

1. Flat Acrylic Finish: Two finish coats over a primer.

a. Primer: Interior gypsum board primer.
b. Finish Coats: Interior flat acrylic paint.

2. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.

a. Primer: Interior gypsum board primer.
b. Finish Coats: Interior semigloss acrylic enamel.

D. Wood and Hardboard: Provide the following paint finish systems over new interior wood surfaces:

1. Semigloss Acrylic-Enamel Finish: Two finish coats over a wood undercoater.

a. Primer: Interior wood primer for acrylic-enamel and semigloss alkyd-enamel finishes.
b. Finish Coats: Interior semigloss acrylic enamel.

E. Ferrous Metal: Provide the following finish systems over ferrous metal:

1. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.

a. Primer: Interior ferrous-metal primer.
b. Finish Coats: Interior semigloss acrylic enamel.

3.5 INTERIOR STAIN AND NATURAL-FINISH WOODWORK SCHEDULE

A. Stained Woodwork: Two finish coats of varnish over a sealer coat and interior wood stain.

1. Stain Coat: Interior wood stain.
2. Sealer Coat: Clear sanding sealer.
3. Finish Coats: Interior alkyd- or polyurethane-based clear satin varnish.

END OF SECTION 09912

SECTION 10522 - FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

B. Fire-Rated, Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

PART 2 - PRODUCTS

2.1 FIRE-PROTECTION CABINETS

A. Fire-Protection Cabinets : Enameled-steel, recess-mounted cabinets for fire extinguisher.

1. Products:
   a. JL Industries, Inc.
   b. Kidde Fyrnetics.
   c. Larsen's Manufacturing.
   d. Potter Roemer; Div. Of Smith Industries.
   e. Waltrous; Div. Of American Specialties
2. Door Material: Baked-Enameled steel.
3. Door Glazing: Acrylic bubble.
4. Door Style: Full bubble with frame.
5. Accessories: Mounting brackets.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install cabinets at 54 inches above finished floor to top of cabinet .

END OF SECTION 10522

SECTION 10523 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Product Data.

B. Fire Extinguishers: NFPA 10, listed and labeled for the type, rating, and classification of extinguisher.

PART 2 - PRODUCTS

2.1 FIRE EXTINGUISHERS AND BRACKETS

A. Portable Fire Extinguishers:

1. Products:
   a. JL Industries, Inc.
   b. Kidde Fyrnetics.
   c. Larsen's Manufacturing.
   d. Potter Roemer; Div. Of Smith Industries.
2. Multipurpose Dry-Chemical Type: UL-rated 4-A:60-B:C, 10-lb nominal capacity.

B. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for fire extinguishers indicated, with plated or baked-enamel finish.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install mounting brackets in locations indicated at 54 inches above finished floor.

B. Install fire extinguishers in mounting brackets and cabinets where indicated

END OF SECTION 10523

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work in this section includes furnishing and installation of extruded aluminum overhead hanger rod style canopies.

B. Related Items and Considerations
1. Flashing of various designs may be required. Supplied by the installer.
2. Determine wall construction, make-up and thickness.
3. Ensure adequate wall condition to carry canopy loads where required.
4. Consider water drainage away from canopy where necessary.
5. Any necessary removal or relocation of existing structures, obstructions or materials.

1.2 FIELD MEASUREMENT

A. Confirm dimensions prior to preparation of shop drawings when possible.

B. Submit shop drawings showing structural component locations/positions, material dimensions and details of construction and assembly.

1.3 PERFORMANCE REQUIREMENTS

A. Canopy must conform to local building codes.

B. Determine if specific load requirements have been established for canopies and if stamped calculations are required for location in which canopy is installed.

1.4 DELIVER, STORAGE, HANDLING

A. Deliver and store all canopy components in protected areas.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Mapes Canopies
Lincoln, Nebraska
Phone: 1-888-273-1132.
Fax: 1-877-455-6572.

B. Superior Metal Products Company Inc.
116 Citation Court
Birmigham Alabama 35209

C. Conservatek
498 N. Loop 336E
Conroe, TX 77301

D. Or approved equal.

2.2 MATERIALS

A. Decking and fascia shall be extruded aluminum, alloy 6063-T6.

B. Decking Shall be 2 3/4" Extruded .078" Decking

C. Hanger rods and attachment hardware shall be powder coated to match canopy.

D. Fascia shall be standard 8" extruded "G" style (minimum .125 aluminum)

2.3 Finishes

A. Standard factory clear anodized.

2.4 FABRICATION

A. All connections shall be mechanically assembled utilizing 3/16" fasteners with a minimum shear stress of 350 lb. Pre-welded or factory-welded connections are not acceptable.

B. Decking shall be designed with interlocking extruded aluminum members with mechanical fasteners field applied to provide structural integrity for the completed assembly.

C. Concealed drainage. Water shall drain from covered surfaces into integral fascia gutter and directed to either the front for front drainage or to the rear for ground level discharge via one or more designated downspouts.

PART 3 - EXECUTION

3.1 INSPECTION

A. Confirm that surrounding area is ready for the canopy installation.

B. Erection shall be performed by an approved installer and scheduled after all concrete, masonry and roofing in the area is completed

3.2 INSTALLATION

A. Installation shall be in strict accordance with manufacturer's shop drawings. Particular attention should be given to protecting the finish during handling and erection.

B. After installation, entire system shall be left in a clean condition.

SECTION 10801 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Toilet and bath accessories.
2. Underlavatory guards.

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options, and finishes for each type of accessory specified.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required. Use designations indicated in the Toilet and Bath Accessory Schedule and room designations indicated on Drawings in product schedule.

1.4 QUALITY ASSURANCE

A. Source Limitations: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise approved by Architect.

1. Products of other manufacturers with equal characteristics, as judged solely by Architect, may be provided.

1.5 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.6 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Manufacturer's Mirror Warranty: Written warranty, executed by mirror manufacturer agreeing to replace mirrors that develop visible silver spoilage defects within minimum warranty period indicated.

1. Minimum Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide accessories by one of the following:

1. Toilet and Bath Accessories:

a. A & J Washroom Accessories, Inc.
b. American Specialties, Inc.
c. Bobrick Washroom Equipment, Inc.
d. Bradley Corporation.
e. General Accessory Manufacturing Co. (GAMCO).
f. McKinney/Parker Washroom Accessories Corp.

2. Underlavatory Guards:

a. Brocar Products, Inc.
b. Truebro, Inc.

2.2 MATERIALS

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

B. Brass: ASTM B 19, leaded and unleaded flat products; ASTM B 16 (ASTM B 16M), rods, shapes, forgings, and flat products with finished edges; ASTM B 30, castings.

C. Sheet Steel: ASTM A 366/A 366M, cold rolled, commercial quality, 0.0359-inch minimum nominal thickness; surface preparation and metal pretreatment as required for applied finish.

D. Galvanized Steel Sheet: ASTM A 653/A 653M, G60 (Z180).

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

F. Mirror Glass: ASTM C 1036, Type I, Class 1, Quality q2, nominal 6.0 mm thick, with silvering, electroplated copper coating, and protective organic coating complying with FS DD-M-411.

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

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

2.3 FABRICATION

A. Surface-Mounted Toilet Accessories: Unless otherwise indicated, fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with continuous stainless-steel hinge. Provide concealed anchorage where possible.

B. Mirror-Unit Hangers: Provide mirror-unit mounting system that permits rigid, tamper- and theft-resistant installation, as follows:

1. One-piece, galvanized steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
2. Heavy-duty wall brackets of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.

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

PART 3 - EXECUTION

3.1 INSTALLATION

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

B. Secure mirrors to walls in concealed, tamper-resistant manner with special hangers, toggle bolts, or screws. Set units level, plumb, and square at locations indicated, according to manufacturer's written instructions for substrate indicated.

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

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

3.3 TOILET AND BATH ACCESSORY SCHEDULE

A. Toilet Tissue Dispenser:
   1. Type: Roll-in-reserve dispenser with hinged front secured with tumbler lockset..
   2. Mounting: Surface mounted with concealed anchorage..
   3. Material: Stainless steel..

B. Grab Bar :
   1. Material: Stainless steel, 0.05 inch thick.
   2. Mounting: Concealed.
   3. Gripping Surfaces: Smooth, satin finish.
   4. Outside Diameter: 1-1/4 inches .

C. Mirror Unit :
   1. Frame: Stainless-steel angle, 0.05 inch thick Stainless-steel channel.

D. Underlavatory Guard:
   1. Insulating Piping Coverings: White, antimicrobial, molded-vinyl covering for supply and drain piping assemblies intended for use at accessible lavatories to prevent direct contact with and burns from piping. Provide components as required for applications indicated with flip tops at valves that allow service access without removing coverings.

END OF SECTION 10801

SECTION 13125 - METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes metal building systems that consist of integrated sets of mutually dependent components including structural framing and accessories.

B. See Division 3 Section "Cast-in-Place Concrete" for concrete foundations, slabs, and anchor-bolt installation.

1.2 SYSTEM PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal building systems capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Engineer metal building systems according to procedures in MBMA's "Metal Building Systems Manual."
2. Design Loads: Collateral: 2 lbs p.s.f. all others as indicated on Drawings.

B. Seismic Performance: Design and engineer metal building systems capable of withstanding the effects of earthquake motions determined according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads." IBC 2003 Seismic Design Category "D".

1.3 SUBMITTALS

A. Product Data: For each type of metal building system component indicated.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
2. Anchor-Bolt Plans: Submit anchor-bolt plans before foundation work begins. Include location, diameter, and projection of anchor bolts required to attach metal building to foundation. Indicate column reactions at each location.
3. Structural-Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.

C. Letter of Design Certification: Signed and sealed by a qualified professional engineer. Include the following:

1. Name and location of Project.
2. Order number.

3. Name of manufacturer.
4. Name of Contractor.
5. Building dimensions including width, length, height, and roof slope.
6. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
7. Governing building code and year of edition.
8. Design loads and load combinations.
9. Building-use category.

1.4 QUALITY ASSURANCE

A. Erector Qualifications: An experienced erector who has specialized in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.

B. Manufacturer Qualifications: A qualified manufacturer and member of MBMA.
   1. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

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

D. Structural Steel: Comply with AISC's "Specification for Structural Steel Buildings--Allowable Stress Design, Plastic Design," or AISC's "Load and Resistance Factor Design Specification for Structural Steel Buildings," for design requirements and allowable stresses.

E. Cold-Formed Steel: Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members," or AISI's "Load and Resistance Factor Design Specification for Steel Structural Members," for design requirements and allowable stresses.

F. Pre-Erection Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to metal building systems including, but not limited to, the following:

   1. Inspect and discuss condition of foundations and other preparatory work performed by other trades.
   2. Review structural load limitations.
   3. Review required testing, inspecting, and certifying procedures

1.5 PROJECT CONDITIONS

A. Established Dimensions for Foundations: Comply with established dimensions on approved anchor-bolt plans, establishing foundation dimensions and proceeding with fabricating structural framing without field measurements. Coordinate anchor-bolt installation to ensure that actual anchorage dimensions correspond to established dimensions.

1.6 COORDINATION

A. Coordinate size and location of concrete foundations and casting of anchor-bolt inserts into foundation walls and footings. Concrete, reinforcement, and formwork requirements are specified in Division 3 Section "Cast-in-Place Concrete."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

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

1. Alliance Steel, Inc.
2. American Buildings Company.
3. American Steel Building Company, Inc.; Division of NCI Building Systems, LLP.
4. Behlen Mfg. Co.
5. Butler Manufacturing Company.
6. Ceco Building Systems; Division of Robertson-Ceco Corporation.
7. Crown Metal Buildings, Inc.
8. Garco Building Systems.
9. Gulf States Manufacturers, Inc.
10. Mesco Metal Buildings; Division of NCI Building Systems, LLP.
11. Metallic Metal Building Company; Division of NCI Building Systems, LLP.
12. Package Industries, Inc.
13. Southern Structures, Inc.
14. Spirco Manufacturing; Division of Metal Building Products, Inc.
15. Star Building Systems; Division of Robertson-Ceco Corporation.
16. Steelox Systems Inc.
17. United Structures of America, Inc.
18. VP Buildings, Inc.; a United Dominion Company.

2.2 STRUCTURAL-FRAMING MATERIALS

A. W-Shapes: ASTM A 992/A 992M; ASTM A 572/A 572M, Grade 50 or 55; or ASTM A 529/A 529M, Grade 50 or 55.

B. Channels, Angles, M-Shapes, and S-Shapes: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or 55; or ASTM A 529/A 529M, Grade 50 or 55 .

C. Plate and Bar: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or 55; or ASTM A 529/A 529M, Grade 50 or 55.

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

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

F. Structural-Steel Sheet: Hot-rolled, ASTM A 1011/A 1011M, Structural Steel (SS), Grades 30 through 55, or High-Strength Low Alloy Steel (HSLAS), Grades 45 through 70; or cold-rolled, ASTM A 1008/A 1008M, Structural Steel (SS), Grades 25 through 80, or High-Strength Low Alloy Steel (HSLAS), Grades 45 through 70.

G. Non-High-Strength Bolts, Nuts, and Washers: ASTM A 307, Grade A, carbon-steel, hex-head bolts; ASTM A 563 carbon-steel hex nuts; and ASTM F 844 plain (flat) steel washers.

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

I. Unheaded Anchor Rods: ASTM F 1554, Grade 36
   1. Nuts: ASTM A 563 hex carbon steel.
   2. Plate Washers: ASTM A 36/A 36M carbon steel.
   3. Washers: ASTM F 436 hardened carbon steel.
   4. Finish: Plain.

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

   1. Nuts: ASTM A 563 hex carbon steel.
   2. Plate Washers: ASTM A 36/A 36M carbon steel.
   3. Washers: ASTM F 436 hardened carbon steel.
   4. Finish: Plain

K. Threaded Rods: ASTM A 193/A 193M.

   1. Nuts: ASTM A 563 hex carbon steel.
   2. Washers: ASTM A 36/A 36M] carbon steel.
   3. Finish: Plain.

L. Primer: SSPC-Paint 15, Type I, red oxide.

2.3 FABRICATION, GENERAL

A. Tolerances: Comply with MBMA's "Metal Building Systems Manual": Chapter IV, Section 9, "Fabrication and Erection Tolerances."

2.4 STRUCTURAL FRAMING

A. General:

   1. Primary Framing: Shop fabricate framing components to indicated size and section with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.

      a. Make shop connections by welding or by using high-strength bolts.

b. Join flanges to webs of built-up members by a continuous submerged arc-welding process.
c. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin or girt web, so flange compressive strength is within allowable limits for any combination of loadings.
d. Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary structural members with specified primer after fabrication.

2. Secondary Framing: Shop fabricate framing components to indicated size and section by roll-forming or break-forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.

a. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary structural members with specified primer after fabrication.

B. Primary Framing: Manufacturer's standard structural primary framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafter, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing. Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.

1. Rigid Clear-Span Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Interior columns are not permitted.
2. Rigid Modular Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Provide interior columns fabricated from round steel pipe or tube, or shop-welded, built-up steel plates.
3. Exterior Column Type: Tapered.
4. Rafter Type: Tapered.

C. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly to comply with the following:

1. End-Wall and Corner Columns: I-shaped sections fabricated from structural-steel shapes; shop-welded, built-up steel plates; or C-shaped, cold-formed, structural-steel sheet; with minimum thickness of 0.0598 inch .
2. End-Wall Rafters: C-shaped, cold-formed, structural-steel sheet; with minimum thickness of 0.0598 inch; or I-shaped sections fabricated from shop-welded, built-up steel plates or structural-steel shapes.

D. Secondary Framing: Manufacturer's standard secondary framing members, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Fabricate framing from cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet prepainted with coil coating, unless otherwise indicated, to comply with the following:

1. Purlins: C- or Z-shaped sections; fabricated from minimum 0.0598-inch- thick steel sheet, built-up steel plates, or structural-steel shapes; minimum 2-1/2-inch- wide flanges.
   a. Depth: 8""

2. Girts: C- or Z-shaped sections; fabricated from minimum 0.0598-inch-thick steel sheet, built-up steel plates, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 40 to 50 degrees to flange and with minimum 2-1/2-inch- wide flanges.
   a. Depth: 8".

3. Eave Struts: Unequal-flange, C-shaped sections; fabricated from 0.0598-inch- thick steel sheet, built-up steel plates, or structural-steel shapes; to provide adequate backup for metal panels.
4. Flange Bracing: Minimum 2-by-2-by-1/8-inch structural-steel angles or 1-inch diameter, cold-formed structural tubing to stiffen primary frame flanges.
5. Sag Bracing: Minimum 1-by-1-by-1/8-inch structural-steel angles.
6. Base or Sill Angles: Minimum 3-by-2-by-0.0598-inch zinc-coated (galvanized) steel sheet.
7. Purlin and Girt Clips: Minimum 0.0598-inch- thick, steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.
8. Secondary End-Wall Framing: Manufacturer's standard sections fabricated from minimum 0.0598-inch-thick, structural-steel sheet.
9. Framing for Openings: Channel shapes; fabricated from minimum 0.0598-inch- thick, cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings, and head, jamb, and sill of other openings.
10. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.

E. Bracing: Provide adjustable wind bracing as follows:

1. Rods: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50; or ASTM A 529/A 529M, Grade 50; minimum 1/2-inch- diameter steel; threaded full length or threaded a minimum of 6 inches at each end.
2. Cable: ASTM A 475, 1/4-inch- diameter, extra-high-strength grade, Class B zinc-coated, 7-strand steel; with threaded end anchors.
3. Angles: Fabricated from structural-steel shapes to match primary framing, of size required to withstand design loads.
4. Rigid Portal Frames: Fabricate from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
5. Fixed-Base Columns: Fabricate from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
6. Diaphragm Action of Metal Panels: Design metal building to resist wind forces through diaphragm action of metal panels.
7. Bracing: Provide wind bracing using any method specified above, at manufacturer's option.

F. Bolts: Provide plain finish bolts for structural-framing components that are primed or finish painted.

G. Factory-Primed Finish: Apply specified primer immediately after cleaning and pretreating.

1. Prime primary, secondary, and end-wall structural-framing members to a minimum dry film thickness of 1 mil.

a. Prime secondary steel framing formed from uncoated steel sheet to a minimum dry film thickness of 0.5 mil on each side.

2.5 ACCESSORIES

A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.

PART 3 - EXECUTION

3.1 ERECTION

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

B. Erect metal building system according to manufacturer's written erection instructions and erection drawings.

C. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.

D. Set structural framing accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.

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

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

F. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment. Level and plumb individual members of structure.

G. Primary Framing and End Walls: Erect framing true to line, level, plumb, rigid, and secure. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist cure grout for not less than seven days after placement.

1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and snug-tightened or pretensioned joints.

H. Secondary Framing: Erect framing true to line, level, plumb, rigid, and secure. Fasten secondary framing to primary framing using clips with field connections using non-high-strength bolts.

1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
2. Locate and space wall girts to suit openings such as doors and windows.
3. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.

I. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.

1. Tighten rod and cable bracing to avoid sag.
2. Locate interior end-bay bracing only where indicated.

J. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.

K. Erection Tolerances: Maintain erection tolerances of structural framing within AISC's "Code of Standard Practice for Steel Buildings and Bridges.

3.2 CLEANING AND PROTECTION

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

B. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing and accessories.

1. Clean and prepare surfaces by SSPC-SP 2, "Hand Tool Cleaning," or SSPC-SP 3, "Power Tool Cleaning."
2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

END OF SECTION 13125

DIVISION 15000
SECTION 15010
BASIC MECHANICAL REQUIREMENTS

PART I - GENERAL

1.01 RELATED DOCUMENTS

A. The General Conditions, Special Conditions, and instructions to Bidders are part of this Division of the Specifications and shall be consulted as to detail as they apply to all work in this Division of the Specifications.

1.02 RELATED WORK IN OTHER DIVISION

A. Electrical - Division 16

1.03 CODES

A. All materials furnished and all work installed shall comply with the International Building Code, National Fire Code of the National Fire Protection Association.

B. All materials furnished shall be UL listed and/or FM approved, and all work installed shall comply with the requirements of the Underwriters' Laboratories, Inc. (UL), Occupational Safety and Health Act (OSHA), National Fire Protection Association (NFPA).

C. A reference to an ANSI and ASTM standard shall indicate that the article shall conform to that standard in all respects (including material, manufacture, handling, dimensions and test procedure).

1.04 DRAWINGS AND SPECIFICATIONS

A. All drawings and specifications on the project are complementary, each to all other sets, and they shall be used in combination for the execution of this work. Mechanical work shown on any of the contract drawings or any Section of the contract specifications, shall be considered as included in this work unless specifically excluded by inclusion in some other branch of the work. This shall include roughing-in for connections and equipment as called for or inferred. The Contractor shall check all drawings and specifications for the project and shall be responsible for the installation of all mechanical work.

B. The contract drawings for mechanical work are in part schematic, intended to convey the scope of work and indicate the general layout, design and arrangement. The Contractor shall follow these drawings in the layout of his work and shall consult general construction drawings, mechanical drawings and all other drawings for this project to

determine all conditions affecting the mechanical work. The contract drawings are not to be scaled and the Contractor shall verify spaces in which the mechanical work is to be installed.

C. Where specific details and dimensions for mechanical work are not shown on the drawings, the Contractor shall take measurements and make layouts as required for the proper installation of the work and coordination with all other work on the project. In case of any discrepancies between the drawings and the specifications that have not been clarified by addendum prior to bidding, it shall be assumed by the signing of the contract that the higher cost (if any difference in costs) is included in the contract price, and the Contractor shall perform the work in accordance with the drawings or with the specifications, as determined and approved by the Architect, and no additional costs shall be allowed by the contract price.

1.05 SURVEYS AND MEASUREMENTS

A. Base all measurements, both horizontal and vertical, on established marks. All work shall agree with these established lines and levels. Verify all measurements at the site and check the correctness of same as related to work.

B. Should any discrepancy be discovered between actual measurements and those indicated which prevents following good practice or the intent of the drawings and specifications, notify the Owner's Representative and do not proceed with the work until instructions have been received from him.

1.06 WORKMANSHIP

A. Furnish the services of an experienced superintendent, who shall be constantly in charge of the installation of the work, together with all skilled workmen required to unload, erect, connect, adjust, start, operate and test the systems.

B. Unless otherwise specifically indicated on the plans or specifications, all equipment and materials shall be installed in accordance with the recommendations of the manufacturer. This includes the performance of all tests recommended by the manufacturer.

1.07 ACCESSIBILITY

A. Provide adequate clearance in accordance with all codes and regulations, 3 feet minimum, for the proper installation of this work. Cooperate with all other Contractors whose work is in the same space, and advise the General Contractor of mechanical requirements.

B. Locate all equipment which must be serviced, operated or maintained in fully accessible positions. Minor deviations from drawings may be made in order to allow for better accessibility.

1.08 FOUNDATIONS, SUPPORTS AND ATTACHMENTS

A. All equipment and materials shall be securely attached to the building structure in an approved manner. Attachments shall be of a strong and durable nature and suitable for the service required. See Section 15050 for hangers.

1.09 CUTTING AND PATCHING

A. General Contractor shall be responsible for all cutting and patching necessary to install the work specified in this section unless specifically noted otherwise. Patching shall match adjacent surfaces.

B. No structural member shall be cut without the approval of the Architect, and all such cutting shall be done in a manner directed by him.

1.10 SHOP DRAWINGS AND MATERIAL LIST

A. Before submitting shop drawings and material list, the Contractor shall verify that all equipment submitted is mutually compatible and suitable for the intended use. He shall verify that all equipment will fit in the available space and allow ample room for maintenance. If the size of equipment furnished makes necessary any change in location, or configuration, the Contractor shall submit a shop drawing showing the proposed layout.

B. The Engineer's checking and subsequent approval of such drawings, schedules, literature, or illustrations shall not relieve the Contractor from responsibility for deviations for Drawings or Specifications unless he has, in writing, called the Architect's attention to such deviations at the time of submission, and secured his written approval; nor shall it relieve him from responsibility for errors in dimensions, details, size of members, or omissions of components for fittings; or for coordinating items with actual building conditions and adjacent work.

C. Any corrections or modifications made by the Owner shall be deemed acceptable to the Contractor at no change in price unless written notice is received by the Owner prior to the performance of any work incorporating such corrections or modifications.

D. All submittals shall be complete with manufacturers installation instructions.

PART II - PRODUCTS

2.01 NONE

PART III - EXECUTION

3.01 NONE

END OF SECTION

DIVISION 15000
SECTION 15050
BASIC MECHANICAL MATERIAL AND METHODS

PART I - GENERAL

1.01 RELATED DOCUMENTS

A. The General Conditions, Special Conditions, and instructions to Bidders are part of this Division of the Specifications and shall be consulted as to detail as they apply to all work in this Division of the Specifications.

1.02 PIPE HANGERS AND SUPPORTS

A. Unless specified otherwise, pipes shall be hung with malleable iron, split ring hangers or with heavy steel band or clevis hangers not less than 1/8" thick. Hangers in contact with copper pipe shall be copper plated. Strap type hangers shall not be acceptable. Hangers shall have rods and turnbuckles of required length. Suspension shall be from suitable steel supports fastened to over head construction of steel wall brackets. Hangers and supports shall be installed so that pipes are run parallel and evenly spaced.

B. Steel supports and steel wall brackets shall be prefabricated units as manufactured by Kindorf, Unistrut, Elcen, Fee and Mason. Anchors in concrete construction shall be Star or A-J threaded compound type or Phillips self-drilling type of sufficient size to adequately support the load. Supports on masonry walls shall have bolts through wall fastened to suitable steel plate on back of wall. Where required to allow for movement of pipe by expansion due to short hanger rods, pipes shall rest on rollers and covering protection saddles. All piping shall be supported and secured as required to prevent vibration and the transmission of noise and lateral movement.

C. Where pipes are supported or hung from steel bar joists, the pipe supports or hangers shall not be hung from or fastened to the bottom members of the joists, but shall be supported from and fastened to the top member of the joists with supports, clamps, or fasteners manufactured for this purpose. Where pipes are supported or hung from concrete pan joists, the supports or hangers shall be anchored into the sides of the joists to clear the reinforcing steel, and shall not be anchored into the bottom of the joists. Where runs of piping are parallel to the joists and are located between the joists, pre-fabricated support channels shall be installed to span between the joist for support of hangers and the channel supports shall be anchored to joists at locations as herein before specified.

D. On all insulated pipe, hangers shall have Pipe Shields, Inc. CS-CW, or approved equal, insulation shield assembly, consisting of rigid galvanized steel jacket with high density molded pipe insulation insert (two-piece for 360 degrees around pipe) of silicon

impregnated calcium silicate, or of other high density insulating material with compressive strength of not less than 75 psi average, K factor not greater than .29 @ 100 F. mean temperature, and for working temperature range of 20 F. to 400 F. Molded insulation insert shall extend at least 1" on each end beyond the shield. Size and length of shield shall be in accordance with the manufacturer's published schedule for the size of pipe and the insulation thickness. Unit shall include top and bottom sections of insulation of same thickness as adjoining insulation and shall be vapor-proofed. Insulation shall be impervious to water. Insulation on each side of insert shall be butted tightly against the insert and the joists shall be sealed vapor-tight and taped.

E. Maximum spacing of hangers shall be in accordance with the following schedule for size of pipe:

Size Pipe	Rod Size	Ferrous Pipe	Copper Pipe	Plastic Pipe
1/2" & 3/4"	1/4"	8'-0"	6'-0"	4'-0"
1" & 1-1/4"	3/8"	9'-0"	7'-0"	4'-0"
1-1/2"	3/8"	9'-0"	8'-0"	4'-0"
2" & 2-1/2"	3/8"	10'-0"	10'-0"	4'-0"
3"		10'-0"	10'-0"	4'-0"
4" & Larger		10'-0"	10'-0	5'-0"

Hanger rod shall be 1/2" for pipes 3" thru 5", 5/8" for pipes 6" and 8" in size, 3/4" for 10".

1.02 SLEEVES AND OPENINGS

A. Furnish and set all boxouts for openings and all sleeves for work to be installed under this division. Sleeves shall be installed for all pipes passing through floors, walls, partitions, roof, and foundations.

B. Sleeves passing through interior walls and partitions shall be Pipe Shields, Inc., or approved equal, prefabricated assemblies of Model Type, construction, and installation as follows:

1. For Bare Pipes Thru Walls and Partitions: Model WFB, consisting of telescoping galvanized sheet steel sleeve with attached square galvanized steel closure plate at each end and with annular space packing (at each end) of fireproof material with positive fastening catch for fire, smoke, air, and sound barrier.
2. For Insulated Pipes Thru Walls and Partitions: Model WFB-CS-CW, consisting of same as specified for Model WFB above, except the assembly shall also consist of two-piece, 360 degrees around pipe, waterproofed calcium silicate insert of same thickness at insulation used on pipe. The insulation insert shall extend at least 1" beyond each end of sleeve so that pipe insulation can be butted tight against insert and the joints sealed vaportight.

3. Size and Installation: Sleeve assemblies shall be furnished of proper diameter for bare pipe and insulated pipe, as applicable, and sleeves for insulated pipes shall have insulation inserts of same thickness as the insulation thickness specified for the pipe. Proper length of sleeve shall be furnished as required for the wall construction thickness through which the sleeve is installed. Pipe shall be centered through the sleeve. The pipe insulation shall be tight against the sleeve insulation inserts, the joints sealed vapor-tight and taped. The joints between the top and bottom pieces of the insulation inserts shall be sealed vapor-tight with mastic before sliding into sleeve. Approved fire barrier caulking shall be installed at each end of sleeve in accordance with the manufacturer's instructions to seal off the annular space between pipe and sleeve fire and smoke tight.

C. Sleeves for pipes through floors, shall be schedule 30 or heavier steel pipe, sized at least 1 inch larger than the outside diameter of pipe for bare pipe and at least 1 inch larger than the outside diameter of insulation for insulated pipe. Sleeves shall extend 2" above floor surface. For insulated pipe, provide calcium silicate insert of same thickness as pipe insulation and to extend 1" above and below sleeve. Make vapor-tight seal between insulation and insert joints. Pack annular space between sleeves and bare pipe or calcium silicate insert and seal top and bottom to be completely waterproof and fireproof as hereinafter specified.

D. Sleeves through outside walls, foundations walls, waterproofed slabs and slabs on grade, shall be steel pipe and the annular space shall be sealed with Thunderline Corp., "Lind-Seal" modular wall seals to provide airtight and moisture tight seal in above ground installations and a hydrostatic seal in below ground installations. Seals shall be synthetic rubber links and zinc phosphate plated steel bolts and links shall remain flexible from -40° F to 250° F and shall be resistant to aging, ozone, water and chemical action. Sleeve size shall be in accordance with the seal manufacturer's recommendations for each size pipe and the seals shall be sized and installed in accordance with the manufacturer's recommendations and printed instructions. Sleeves shall be flush with wall at each end. Sleeves thru floor slabs shall finish 2" above floor. The installer shall be responsible for the sealing of construction around the outside of the sleeves. The seal shall be watertight and shall match adjacent surface finish. Sleeves and seals through slab on grade floors unless indicated otherwise on drawings.

1.03 PIPES THROUGH ROOF

A. All pipes through roof shall be installed with sleeves and openings, and with roof flashing/counterflash assembly or pipe curb assembly as herein specified. The complete installation shall be coordinated with the roofing installer and shall be watertight and weathertight.

B. Sleeves shall be steel pipe and shall be installed for single pipe installation. Openings shall be boxed out for multiple installations. Sleeves for acid waste vent stacks shall be installed as hereinbefore specified under the Heading: Sleeves And Openings.

C. Single uninsulated pipes through roof shall be installed with Stoneman Model R-S1300-4, or approved equal, flashing/counterflashing assembly with four pound seamless lead flashing assembly with 8" high boot and not less than 8" skirt; conical shaped steel reinforcing boot underneath lead flashing assembly; and cast iron counterflashing fitting with rust-resistant prime coat, of the caulking type to fit over all types of piping, vandalproof setscrews for anchoring in place, and top annular space for sealant fill. Assemblies shall be furnished in sizes to properly fit size of pipe with which they are installed. Flashing assembly shall be designed to fit properly on roofs from level up to 20° pitch. Top of flashing cone shall be sealed with Stoneman "Permaseal" before installing counterflash fitting. Annular space in top of counterflash fitting shall be completely filled with epoxy sealing compound.

1.04 PIPE AND FITTINGS

A. Shall be Schedule 40 PVC plastic pipe and solvent weld fittings. Connections to other piping materials shall be with flanged couplings.

1.05 INSTALLATION OF PIPING

A. All pipe, fittings, valves, etc., shall be cleaned of grease, dirt, scale and foreign materials before installation. All temporary pipe openings shall be kept closed during the performance of the work. The ends of the pipe shall be reamed smooth and all burrs removed before installation.

B. All pipe shall be cut accurately to measurements taken on job. Offset connections shall be installed for alignment of vertical to horizontal piping and where required to make a true connection and to provide for expansion. Bent or sprung pipe shall not be acceptable.

C. Expansion joints or expansion loops and offsets shall be installed where shown on plans and where necessary to provide for expansion of piping. Suitable pipe anchors shall be installed at expansion joints, loops and offsets. Piping connections shall have unions where necessary for replacement and repair of equipment. Shut-off valves, flow control valves and control valves shall be in stalled where shown and where necessary for proper operation and service. Vertical piping shall be plumb, horizontal piping shall be run as high as possible and all piping shall be run parallel to or at right angles with lines and surfaces of the building. Piping shall be supported as required to prevent transmission of noise and vibration. Vertical pipe shall be adequately supported to prevent lateral movement.

D. Final connections to all equipment and fixtures shall be made in a manner that will permit the complete removal of any fixtures or any piece of equipment without cutting pipe lines.

E. Piping in finished rooms shall be installed concealed behind wall furring or above suspended ceiling wherever possible. Work shall include all pipe, fittings, offsets, etc., as required for the installation of piping to meet all construction conditions and allow for the installation of other work including ducts and conduit. All changes in direction of pipe shall be made with fittings; bending of pipe will not be allowed. Reducing fittings shall be used where pipe changes size. The use of reducing bushings will not be allowed. All piping shall be installed with ample clearance for installation of covering. All piping shall be installed to center accurately in sleeves through floors, walls and partitions.

1.06 TEST OF PIPING SYSTEMS

A. All piping systems shall be pressure tested for leaks as herein specified. Test pressure shall remain on each system for not less than 8 hours. If leaks develop, test shall be repeated after leaks are corrected. Test pressures shall be as shown for each type of piping and installation in article 15100, "Pipe and Fittings". The Owner's representative shall be notified at least 48 hours prior to the scheduled test of piping system so that arrangements can be made for the Owner's representative to observe the test.

B. No part of the piping systems shall be covered or concealed until it has been tested, tests observed and system approved by the Owner's representative. All tests performed shall be confirmed in writing and signed by Architect or Owners Representative.

C. All equipment, materials, temporary installations, connections, by-passes, and instruments required for the testing shall be furnished and installed by the Contractor. After testing has been completed and the system has been approved by the Architect, the Contractor shall remove all temporary equipment, materials and connections.

1.07 VALVES AND SPECIALTIES

A. Valves shall be installed within each system to provide the required flow control and to provide isolation for inspection, maintenance and repair of each piece of equipment and each main and branch service loop as shown and specified. Each valve shall be installed so as to be easily accessible for operation and visual inspection after construction is complete. A union connection shall be installed within two feet on each screw end valve. Valves shall be Crane, Conbraco, Nibco, Jenkins, Stockham, Powell, Walworth, Hammond, Centerline, Milwaukee, Norris, Fisher, Rockwell or approved equal.

B. Unless noted otherwise, cut-off valves shall be ball valves or butterfly valves. Flow

control (balancing) valves shall be ball valves or butterfly for dual function of manual flow control (balancing) adjustment and cut-off duty, if valve has "memory" setting feature.

C. Unless specified otherwise cut-off valves used in water systems shall be ball valves for 2" size and smaller, and shall be butterfly valves for 2-1/2" size and larger.

D. Ball valves, unless specified otherwise, shall be Conbraco Industries "Apollo" Series 70, or approved equal, all bronze for not less than 400 psi non-shock W.O.G. pressure with replaceable TeflonSeats, blow-out proof stem, 1-1/4" high extended stem to provide for insulating, lever type handle with vinyl grip and 90 degree stop on the extended stem. Valves used for balancing shall have locking type "memory" stop. Valves without at least 1-1/4" high extended stem will not be accepted, unless specified otherwise.

E. Butterfly valves shall have cast lug body, bronze or bronze alloy or stainless steel disc, replace able seat and rated for not less than 150 psi continuous bubbletight duty. Seats for valves in systems operating at 150 F. temperature and below shall be "Buna-N" and for systems operating at temperatures above 150 F. shall be Teflon and EPDM for not less than 250 F. Valves shall be Nibso NL-081 (Buna-N) or NL-082 (EDPM), or approved equal. Valves used for balancing shall have throttle and position lock and handle to provide infinite settings (notched memory settings without position lock is not acceptable) and shall have handle extension to receive up to 1-1/2 thick insulation. Valves 6" size the smaller shall have handle arms.

F. Check valves, except as otherwise specified, shall be Crane #137, or approved equal, all bronze swing check with renewable disc and screwed ends for not less than 300 psi non-shock cold water pressure thru 3" size and Crane #373, or approved equal, iron body, bronze trim with renewable disc and flanged ends for not less than 200 psi non-shock cold water pressure for sizes larger than 3". Valves shall be rated for temperatures to 250 degree F. Check valves in the deionized water system shall be Orion Fittings Inc. "Whiteline", or ap proved equal, polypropylene ball check type manufactured and packaged specifically for high purity water systems, rated for not less than 130 psi working pressure at 80 F.

G. Hose bibs and drain valves for use with hose shall be Nibco #73 or #74, Prier Brass #C-173, or approved equal, brass with composition disc and hose end. Install vacuum breaker in water supply connection to hose bibs and in location to be accessible.

H. Unions for use in ferrous pipe shall be malleable iron with brass to iron ground joint spherical seat and screwed ends. Union for use with copper piping shall be cast brass or cast bronze with ground joint spherical seat and with cast brass or bronze or wrought copper sweat ends. Unions shall be installed wherever necessary for replacement or repair of equipment, valves, strainers, etc. Right and left hand coupling are not acceptable. EPCO, or approved equal, dielectric isolating type union shall be installed

wherever ferrous piping is connected to copper or copper alloy equipment or copper piping.

I. Strainers, unless specified otherwise or shown on drawings otherwise, shall be basket or "Y" type of same size as pipe line and with cast iron body, direction of flow arrow cast in body, and removable screen of not less than .0625 inch thick (22 gauge) sheet brass perforated for total net free area opening equal to four times the area of pipe. Strainers shall have bodies drilled and tapped for drain and blow-down. Furnish and install drain valve with drain line extended to drain for strainers of 4" size and larger.

J. Globe valves shall have iron body with bronze trim. Valves 3" size and smaller shall be Crane #314 1/2P with union bonnet, replaceable stainless steel plug type disc, rated for not less and 150 psi steam working pressure, land with screw ends. Valves above 3" size shall be Crane #21E with yoke bonnet, replaceable bronze, model, or stainless steel disc, rated for not less than 250 psi steam working pressure, and with; flanged ends. Name and working pressure shall be cast into valve body.

1.08 COVER PLATES

A. Wherever exposed pipes pass thru floor, walls, ceiling, and partitions, cover plates shall be installed around pipes and against finished wall, ceiling and floor surfaces. Plates shall be installed on uninsulated piping and around pipe insulation where pipe are insulated. Plates shall be chromium plated cast or stamped brass. Secure plates so that they will not pull away from construction when pipe expands and contracts.

1.09 ACCESS PANELS

A. Where valves, traps, fire dampers, control damper, controls, and other equipment are installed in concealed spaces, access panels shall be installed in ceilings of furring to provide for operation, service, inspection and maintenance.

B. Access panels in non-fire rated construction shall be Milcor, style K, M, DW, or AT as required for wall ceiling construction materials, equivalent Zurn or Wade, flush type steel units with frames. Construction shall be of not less than 16 gauge leveled stock, and fitted with pivot hinges and screw-driver coin type lock and finished with prime coat of paint. Access panels in acoustical tile ceilings shall be style AT recessed type fitted with acoustical tile to match ceiling tile. Panels shall have a minimum size of 12" x 12" for handholes and 24" x 24" for manholes.

C. Access panels in fire rated construction shall be Underwriter's Laboratories rated and labeled assemblies (frame and door) for 1-1/2 hour, "B" label. Each panel assembly shall bear the U.L. Label. Each assembly shall have steel frame and anchors designed for the type construction steel door; continuous steel hinges with stainless steel pin; au-

tomatic closing mechanism on door; self-latching latch-bolt assembly with knob operator on outside and with latch-bolt release on inside; and shall be phosphate treated and have factory prime coat of baked white finish. Assemblies shall be installed in accordance with the instructions furnished by the manufacturer for the U.L. labeling.

D. Accessible ceilings with removable type ceiling tiles do not require access panels to be installed.

1.10 LABELS, SIGNS, AND VALVE TAGGING

A. All new valves shall be identified with a stamped brass or plastic tag attached to the valve with a brass "S" hook or chain. Tags shall be not less than 1-1/2" diameter and with 1/2" de pressed black letters. A list of all valves shall be mounted in a frame with plexiglass cover and shall be permanently fastened to wall in location as directed. Valve lists shall include the following:

1. Valve identification number.
2. System designation (PLBG."CW"; PLBG "HW";etc.)
3. Type valve (gate; ball; auto. control; etc.).
4. Manufacturer and manufacturer's catalog number.
5. Location of valve.

B. All new & existing mechanical equipment shall be identified with engraved phenolic nameplates unless already existing. All starters, disconnect switches, controls and control panels furnished under Division 15 shall also be identified with engraved name-plates, showing the name of equipment controlled. Plates shall be black with white core and shall be securely attached to equipment with screws. List of plates with proposed wording shall be submitted to the Architect for approval prior to manufacturing of plates and installation. Dymo type labels not accepted.

1.11 OPERATION AND MAINTENANCE INSTRUCTION

A. This Contractor shall furnish all services as required for adequate verbal and printed instructions the Owner's operating and maintenance personnel for operation and maintenance of all equipment and systems installed under this Division. Three complete copies of service manuals in hardback binders shall be furnished at the end of the project in accordance with the General Conditions of the specifications. The manuals shall include warranties, printed operating and maintenance instructions for systems and equipment specified under this Division, all approved shop drawings, all manufacturer's printed data, and spare parts list.

B. When the work is complete and at a time designated by the Owner's Representative, the Contractor shall furnish the services of a qualified instructor to instruct Owner's operating and maintenance personnel in the operation and maintenance of the systems and

equipment furnished and installed under this Division.

C. The bound copies of the operating and maintenance manuals shall be used during the verbal instructions.

PART II - PRODUCTS

2.01 NONE

PART III - EXECUTION

3.01 NONE

END OF SECTION

DIVISION 15000
SECTION 15100
PLUMBING

PART I - GENERAL

1.01 RELATED DOCUMENTS

A. The General Conditions, Special Conditions, and instructions to Bidders are part of this Division of the Specifications and shall be consulted as to detail as they apply to all work in this Division of the Specifications.

1.02 WORK INCLUDED

A. Piping
   1. Condensate piping
B. Drawings of Record.

D. Prior to bidding, all Contractors shall visit the site and become familiar with all existing conditions, which will affect construction procedures and scope of work required as part of this Section.

1.03 RELATED WORK

A. Painting by Painting Contractor
B. Cutting and patching by General Contractor
C. Restroom partitions, mirrors, and dispensers by General Contractor.

1.04 CODES AND STANDARDS

A. International Plumbing Code.
B. National Fire Protection Association.
C. American Society of Mechanical Engineers.
D. American Society for Testing and Materials.
E. International Approval Service.
F. American Society of Heating, Refrigerating, and Air Conditioning Engineers.
G. Building Officials and Code Administrators International, Inc.

1.05 SUBMITTALS

A. Shop Drawings shall be submitted to the Architect for approval. The Contractor shall be responsible for quantities and dimensions. The Contractor shall check all shop drawings prior to submission to the Architect.

PART II - PRODUCTS

2.01 PIPE HANGERS AND SUPPORTS

A. See Section 15050.

2.02 SLEEVES AND OPENINGS

A. See Section 15050.

2.03 PIPING MATERIALS

A. All sanitary waste and vent piping inside building shall be Sch 40 PVC pipe and solvent weld fittings.

2.04 INSTALLATION OF PIPING

A. All pipe, fittings, valves, etc., shall be cleaned of grease, dirt, scale and foreign materials before installation. All temporary pipe openings shall be kept closed during the performance of the work. The ends of the pipe shall be reamed smooth and all burrs removed before installation.

B. All pipe shall be cut accurately to measurements taken on job. Offset connections shall be installed for alignment of vertical to horizontal piping and where required to make a true connection and to provide for expansion. Bent or sprung pipe shall not be acceptable.

C. Expansion joints or expansion loops and offsets shall be installed where shown on plans and where necessary to provide for expansion of piping. Suitable pipe anchors shall be installed at expansion joints, loops and offsets. Piping connections shall have unions where necessary for replacement and repair of equipment. Shut-off valves, flow control valves and control valves shall be in stalled where shown and where necessary for proper operation and service. Vertical piping shall be plumb, horizontal piping shall be run as high as possible and all piping shall be run parallel to or at right angles with lines and surfaces of the building. Piping shall be supported as required to prevent transmission of noise and vibration. Vertical pipe shall be adequately supported to prevent lateral movement.

D. Final connections to all equipment and fixtures shall be made in a manner that will permit the complete removal of any fixtures or any piece of equipment without cutting pipe lines. Furnish and install valves, above accessible ceilings, to each individual restroom group.

E. Piping in finished rooms shall be installed concealed behind wall furring or above suspended ceiling wherever possible. Work shall include all pipe, fittings, offsets, etc., as required for the installation of piping to meet all construction conditions and allow for the installation of other work including ducts and conduit. All changes in direction of pipe shall be made with fittings; bending of pipe will not be allowed. Reducing fittings shall be used where pipe changes size. The use of reducing bushings will not be allowed. All piping shall be installed with ample clearance for installation of covering. All piping shall be installed to center accurately in sleeves through floors, walls and partitions.

2.05 OPERATION AND MAINTENANCE INSTRUCTION

A. This Contractor shall furnish all services as required for adequate verbal and printed instructions to the Owner's operating and maintenance personnel for operation and maintenance of all equipment and systems installed under this Division. Three complete copies of service manuals in hardback binders shall be furnished at the end of the project in accordance with the General Conditions of the specifications. The manuals shall include warranties, printed operating and maintenance instructions for systems and equipment specified under this Division, all approved shop drawings, all manufacturer's printed data, and spare parts list.

B. When the work is complete and at a time designated by the Owner's Representative, the Contractor shall furnish the services of a qualified instructor to instruct Owner's operating and maintenance personnel in the operation and maintenance of the systems and equipment furnished and installed under this Division.

C. The bound copies of the operating and maintenance manuals shall be used during the verbal instructions.

PART III - EXECUTION

3.01 INSTALLATION INSTRUCTIONS.

A. All material and equipment shall be installed as recommended by manufacturer. These specifications shall not be construed to vary from manufacturer's written installation instructions without written approval from manufacturer.

B. It shall be the responsibility of this Contractor to visit the site & coordinate with the other trades for clearance, elevations, etc., before installation of any material. Where conflicts exist the Architect shall be notified before installing material. Changes required in work

specified in this Section caused by neglect to do so shall be made at no cost to the Owner or Architect.

C. All disturbing work shall be coordinated to best suit Owner.

D. Arrange with Contractors of other trades for installation of built-in items, blocking, and additional necessary supports.

3.02 PIPE ROUTING

A. All piping shall be concealed except where otherwise shown on Drawings.

B. All piping shall be run parallel and/or perpendicular to building lines and shall be neatly grouped. Piping shall be on warm side of insulation.

C. See Drawings for general routing of pipes and see details of drawings for specific pipe routing.

D. Join all type copper piping per section 15100-2.04.

E. Provide a union or flange connection at each piece of equipment such as water heaters, accessible fixtures etc. between the equipment can be removed or serviced without disturbing remainder of system, draining system or cutting piping.

F. Make all connections between copper and ferrous pipe in domestic water and other open type systems with dielectric unions.

G. Furnish and install shut-off valves for each vertical water piping riser.

3.03 PLUMBING FIXTURE INSTALLATION

A. Provide all fixtures and equipment with compression stops in addition to the faucets. All fixture water stubouts shall be chrome plated if not covered by escutcheons.

B. Provide all grounds and supports for the fixtures and other equipment. Arrange with contractors of other trades for installation of built-in items, blocking, and additional necessary supports.

C. Grout behind all wall hung plumbing fixtures with hard white durable plaster materials to eliminate all voids and cracks and provide sufficient plane bearing surface for mounting.

D. Caulk behind all standard wall hung fixtures with G.E. "Silicone Sanitary Sealant" or other approved mildew resistant, paintable, non-hardening sealant.

3.04 PIPE SUPPORT INSTALLATION

A. Vertical pipe of the following materials shall be supported at intervals not more than the distance prescribed in the following:

Plastic Pipe:	At each story, and at midpoint between floors.

B. Horizontal pipe of the following materials shall be supported at intervals not more than the distances prescribed in the following:

Plastic Pipe (3 inch or less):	At four (4) foot intervals.
Plastic Pipe (4 inch and over):	At five (5) foot intervals.

C. Piping shall be so anchored as to take the load off the stack at the base.

D. Hangers and strapping material shall be of similar materials as the piping to avoid galvanic action.

E. Provide additional hangers at each turn and where concentrated loads such as valves, risers, etc. occur.

F. Trapeze Hangers shall not be permitted.

G. Provide pipe covering protection saddles.

H. Construct rigid structural steel anchors to secure piping to building construction where shown on Drawings and where required to stabilize piping.

I. Furnish and install all supplementary steel angles, channels, beams, etc.; where hanger location falls between joists, purlins or beams; for hanging loads exceeding capacity of a single joist, etc. Safety factor of all such assemblies shall be 5 to 1 minimum.

J. Support all piping and equipment from building construction with adequate hangers, claps, rods inserts.

K. All supporting methods and devices must be approved by the Architect prior to installation. No overloading of any beam, joist, slab, device, etc. will be allowed. Welding to and drilling of structural members must be approved by the Architect. Coordinate support locations with other Contractors.

3.05 WATERPROOFING

A. Plumbing work piercing weatherproof construction shall be made weatherproof by use of Architect approved materials and methods.

3.06 EXPANSION

A. Contractor shall provide for min. 1-1/2" expansion per 100 linear ft. of piping by installing swing joints and/or expansion compensators.

3.07 CUTTING, PATCHING AND PIERCING

A. Obtain written permission of the Architect before cutting or piercing structural members. If, in the process of the mechanical work, ducts, piping or equipment need to be installed in an area after it has been completed, the area shall be left in the same condition it was originally. Patching and/or refinishing will be determined by the Architect.

3.08 ACCESS

A. Equipment, valves and devices shall be mounted in a manner which provides adequate maintenance, inspection access and work space. Where access is required for adjustment, cleanout, inspection of maintenance and such access is not otherwise available, access panels shall be furnished by Division 15 for installation by the Division 5. Panels shall be selected by the Architect.

3.09 BUILDING OPENINGS FOR ADMISSION OR INSTALLATION OF EQUIPMENT

A. The Contractor shall ascertain from his examination of the Architectural and Structural Drawings whether any special temporary or permanent openings in the building for the admission or installation of apparatus furnished under this Contract will be necessary and he shall notify the General Contractor accordingly. He shall pay all cost of making such openings in case of failure to give this notification in time for the General Contractor to arrange for same during construction.

3.10 ESCUTCHEONS

A. Furnish and install escutcheons where uninsulated pipes pass through finished walls, floors or ceilings. Escutcheons shall be chrome plated brass, firmly secured to the pipes and of sufficient outside diameter to amply cover the sleeved openings for the pipes. Escutcheon plates shall be as manufactured by Crane Company or equal. No copper pipe shall be visible after installation.

3.11 SOUND AND VIBRATION

A. All pumps, motors etc. shall be mounted so as to be isolated from the building by approved sound insulation means. All noises and hums of motors, fan etc. shall be so absorbed that the operation will not be heard except in the immediate vicinity of the equipment.

B. Heating, ventilating and air conditioning units shall have sound and vibration isolation factory installed in such a manner that no additional external isolation will be required.

3.12 CLEANING OF EQUIPMENT AND REMOVAL OF RUBBISH

A. All equipment furnished or installed by this Division shall be thoroughly cleaned. At the completion of the work, the Contractor shall remove from the buildings and the premises all rubbish and debris resulting from his operations and shall leave all material and equipment furnished by him and the space occupied by them absolutely ready for use.

B. Under no circumstances shall rubbish be allowed to accumulate in the building or on the premises. All dirt and rubbish resulting from this Division's work shall be removed by this Division from time to time and as often as directed by the Architect and Owner's representative.

3.13 RECORD DOCUMENTS

A. Blackline copy of Drawings shall be kept by this Contractor at the job site at all times for the sole purpose of recording horizontal and vertical location of all concealed and underground plumbing, referenced to permanent visible structures. At completion of job, neatly record all dimensions on a reproducible drawing and submit for approval of Architect.

END OF SECTION

DIVISION 15000
SECTION 15200
DUCTWORK AND ACCESSORIES

PART I - GENERAL

1.01 RELATED DOCUMENTS

A. The General Conditions, Special Conditions, and instructions to Bidders are part of this Division of the Specifications and shall be consulted as to detail as they apply to all work in this Division of the Specifications.

1.02 APPLICABLE PUBLICATIONS

A. The following publications of the issues below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the references thereto;

1. National Environmental Balancing Bureau (NEBB) Publications:
   Procedural Standards for Testing-Balancing-Adjusting of Environmental Systems.
2. National Fire Protection Association (NFPA) Standards:
   90A Air Conditioning and Ventilating Systems.
   91 Blower and Exhaust Systems.
3. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) Publications:
   HVAC Duct Construction Standard.
   Manual for the Balancing and Adjustment of Air Distribution Systems.
4. Underwriters' Laboratories, Inc. (UL) Publications:
   181. Factory-Made Duct Materials and Duct Connectors.
   214. Flame Tests of Flame-Resistant Fabrics.

1.03 GENERAL

A. Conformance with Agency Requirements: The system installation shall conform to the requirements of the National Fire Protection Association, Standard No. 90A.

B. Verification of Dimensions: The Contractor shall visit the premises to thoroughly familiarize himself with all details of the work and working conditions and verify all dimensions in the field, and shall advise the Owner of any discrepancy before performing any work. The Contractor shall be specifically responsible for the coordination and proper relation of his work to the building structure and to the work of all trades.

C. Workmanship: All ductwork shall be mechanically tight and constructed to withstand the pressures involved. Ductwork shall be so constructed and installed as to be completely

free from vibration under all conditions of operation.

D. Leak Testing for the ductwork shall be in accordance with SMACNA "Leak Test" for the pressures stated.

PART II - PRODUCTS

2.01 DUCTWORK AND FITTINGS

A. Fittings and ductwork shall be constructed of galvanized sheet metal in accordance with Federal Spec. QQ-S-775, Type I, Class D, ASTM A525. All edges, slips, etc. shall be worked to leave a smooth interior duct finish. Items not shown in detail or described herein shall be set forth in SMACNA publication "HVAC Duct Construction Standards". Ductwork shall be two inch pressure class construction. Ductwork material shall be a specified hereinafter and suitable for the service intended. All ductwork and fittings shall be constructed and installed in accordance with SMACNA.

B. Branch Take-offs shall be designed, constructed and installed as recommended in SMACNA publication "HVAC Duct Construction Standards". The rectangular branch take-offs shall be a 45 degree entry type as noted in Figure 2-8 of SMACNA "HVAC Duct Construction Standards" manual. The rectangular-to-round branch take-offs shall be a spin-in type as noted in Figure 2-8 of the SMACNA manual, and as herein specified.

C. Turning Vanes for Square Elbows: Square elbows shall have turning vanes assembled with Elgen Mfg. Company's Duro-Dyne, equivalent Aero-Dyne, or approved equal, vane runner. Blades shall be tightly locked to vane runner and securely installed in ductwork for a rattleproof installation.

2.02 DUCTWRAP INSULATION

A. Duct sizes shown on drawings indicate actual sheet metal sizes required.

B. Ductwrap insulation to be installed on all ductwork. Insulation shall be 1-1/2" 0.24 K Factor Ductwrap Insulation.

2.03 ACCESS DOORS IN DUCTS AND HOUSINGS

A. All ducts and housing shall have hinged access doors for access to all automatic dampers, temperature sensing or control devices, fire dampers, damper motors, air filters and all other items within the ductwork or housing which require inspection, service or adjustment. Doors with height and width dimensions of 24" or less, in low velocity ducts or housing, shall be constructed and installed as per details for hinged access doors shown on Figure 2-14, Doors A, B and C, of SMACNA Manual "Low Pressure Duct Construction Standards". Doors with either the height or width dimension

greater than 24" shall be constructed and installed as per details for hinged casing access doors shown on Figure 3-17 of SMACNA Manual "Low Pressure Duct Construction Standards". Doors with either the height or width dimension greater than 24" shall be constructed and installed as per details for hinged casing access doors shown in Figure 3-17 of SMACNA Manual "Low Pressure Duct Construction Standards". Doors shall be gasketed with neoprene or sponge rubber gaskets. Foam plastic gaskets will not be accepted. The Contractor shall be responsible for the location of all doors, regardless of notations on drawings. Existing access doors may be reused as indicated on drawings.

B. Hardware shall be Ventfabrics, Inc. "Ventlok", or approved equal. At the Contractor's option, doors 24" x 24" or smaller may be Air Balance, Inc. "Fireseal", equivalent Ventfabrics, Inc., Cesco, or approved equal, sandwich construction panel door with continuous hinge and camlock latches.

C. Access doors in ductwork shall be of size shown on drawings and where size is not shown shall be 12" x 18" minimum, except where ductwork dimensions will not accept this size, the door shall be as large as the ductwork dimensions will accept.

D. Existing access doors may be reused where shown on drawings.

2.04 DIFFUSERS, REGISTERS AND GRILLES

A. Diffusers, Registers and Grilles shall have the capacity and/or dimensions as shown on the drawing schedules and shall be Titus, Hart & Cooley, Barber Colman, or approved equals. All Grilles & Registers shall be as listed below. Registers shall have internal adjustable throw. Adjust the neck size as shown on drawings for different airflows.

TYPE	BRAND	SERIES
Lay-In Register	Titus	DAT
Lay-In Register with FID	Titus	DAT
Return Grille with FID	Titus	PXP-DF

2.05 DAMPERS

A. Dampers up to 14" may be single blade. Dampers in ducts over 14" shall be opposed multiblade with maximum 8" wide blades. Quadrants shall be Duro-Dyne #KP-20 series, or approved equal.

B. Motorized dampers shall be Ruskin #CD50 or approved equal, less actuators. Actuators by Temperature Control Contractor.

C. Fire dampers shall be Ruskin #IBD2 Type B or Ruskin #CFD5, 100% free area, 1½ hour UL Label per UL 555.

PART III - EXECUTION

3.01 NONE

END OF SECTION

DIVISION 15000
SECTION 15300
HEATING, VENTILATING, AND AIR CONDITIONING

PART I - GENERAL

1.01 RELATED DOCUMENTS

A. The General Conditions, Special Conditions, and instructions to Bidders are part of this Division of the Specifications and shall be consulted as to detail as they apply to all work in this Division of the Specifications.

1.02 DESCRIPTION OF WORK

A. The extent of work is shown on drawings, and includes but is not necessarily limited to the following:

Ductwork
Controls
Manual Dampers
Exhaust Fans

B. Prior to bidding, all Contractors shall visit the site and become familiar with all existing conditions, which will affect construction procedures and scope of work required as part of this Section.

1.03 RELATED WORK

A. Power and control wiring
B. Painting
C. Cutting and patching

1.04 CODES AND STANDARDS

A. American Society of Mechanical Engineers
B. American Society for Testing and Materials
C. American Society of Heating, Refrigerating and Air Conditioning Engineers.
D. Building Officials and Code Administrators International, Inc.
E. Sheet Metal and Air Conditioning Contractors National Association.
F. Underwriter's Laboratories
G. NFPA
H. International Approval Service

1.05 DESIGN CONDITIONS

A. HVAC system design assumes the following:
1. Winter outdoor temperature -10° F.
2. Winter indoor temperature 72° F.
3. Summer outdoor temperature 95° F. D.B. 78° F W.B.
4. Summer indoor temperature 73° F. D.B. 63° F.W.B.

PART II - PRODUCTS

2.01 HVAC EQUIPMENT

A. Shall be as scheduled on Drawings or approved equal.

2.02 DUCTWORK

A. See Section 15200.

2.03 GRILLES AND LOUVERS

A. See Section 15200

B. Louvers shall be Ruskin #ELF-375 all aluminum with bird screen. Color as selected by Architect.

2.04 DAMPERS

A. Manual dampers up to 14" may be single blade. Dampers in ducts over 14" shall be opposed multi-blade with maximum 8" wide blades. Quadrants shall be Duro-Dyne #KP-20 series, or approved equal.

B. Motorized dampers shall be Ruskin #CD35 or approved equal with 120V. electric two-position activators with spring return, Barber Colman #MA-400 Series or approved equal.

2.05 FIRE DAMPERS

A. Shall be Ruskin IBD2 Type B or approved equal.

PART III - EXECUTION

3.01 MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS

A. All materials shall be installed as recommended by manufacturer. Nothing in these specifications shall be construed to vary from manufacturer's written installed

instructions without written approval from manufacturer.

B. It shall be the responsibility of this Contractor to coordinate with the other trades for clearance, elevations, etc., before the installation of any material. Where conflicts exist the Architect shall be notified before installing material. Changes required in work specified in this Section caused by neglect to do so shall be made at no cost to the Owner.

C. Arrange with Contractors of other trades for installation of built-in items, blocking, and additional necessary supports.

3.02 HEATING / AIR CONDITIONING

A. Furnish and install complete and operable heating/air conditioning system, consisting of dampers, exhaust fans, air distribution, exhaust systems, rooftop units, etc.

B. Furnish and install manual volume dampers at each branch takeoff to control each supply air grille individually.

3.03 NOISE AND VIBRATION

A. It is the specific intent of these specifications and design conditions that the system including equipment, piping and other parts, shall be noiseless and free of vibration as a result of the new installation in the building. It shall be the responsibility of this Contractor to correct these conditions at no cost to the Owner.

3.04 WIRING DIAGRAMS

A. Furnish complete wiring diagrams for all equipment furnished by this Contractor. Submit wiring diagrams to Architect with equipment submittals for approval.

3.05 ELECTRICAL EQUIPMENT

A. Starters and thermal protective devices not a factory mounted integral part of equipment specified in this Section shall be furnished by this Contractor for installation by the Electrical Contractor.

3.06 TESTING, ADJUSTING AND AIR BALANCING

A. All systems and equipment shall be put into operation and shall continue to operate for at least three, eight-hour periods until all adjusting, balancing, testing, demonstrations, instruction and cleaning of system have been completed. Submit SMACNA air balance report for approval by Architect.

3.07 OPERATING INSTRUCTIONS AND MAINTENANCE DATA

A. Upon completion and acceptance of the work by the Owner, the Contractor shall provide an experienced Engineer to instruct the Owner's operators in operation of entire installation. Instruction period shall be for a period of one (1) eight-hour working day. Contractor shall provide two (2) sets of 8 1/2" x 11" typed operating and maintenance instructions. Sample maintenance instructions will be provided by Engineer upon request. Contractor shall also include wiring diagrams of all controls in each set of maintenance instructions.

3.08 CLEANUP

A. Upon completion of work under this Section, all unnecessary equipment, materials, rubbish, etc., shall be removed from project site and surrounding area leaving site in a safe and cleared condition.

3.09 PIPING INSTALLATION

A. All piping shall be run parallel and/or perpendicular to building lines and shall be neatly grouped.

B. See drawings for general routing of pipes and see details of drawings for specific pipe routing.

C. All piping shall be supported in a manner to prevent the weight of any piping, valves, fittings, etc. from being born be equipment connections.

3.10 HANGER INSTALLATION

A. Install hangers on maximum 8 ft centers for 1/2" thru 2" steel pipe and maximum 10 ft centers for 2 1/2" steel pipe and larger. Install hangers at maximum 4'-0" O.C. for plastic pipe. Provide rigid insulation of wood blocks and size hangers for O.D. of insulation. Sheet metal saddles on all insulated piping.

3.11 TEMPERATURE CONTROLS

A. Provide 7 day programmable thermostat.

3.12 CUTTING, PATCHING AND PIERCING

A. Obtain written permission of the Architect before cutting or piercing structural members. If, in the process of the mechanical work, ducts, piping or equipment need to be installed in an area after it has been completed, the area shall be left in the same condition it was originally. Patching and/or refinishing will be determined by the Architect.

3.13 ACCESS

A Equipment, valves and devices shall be mounted in a manner which provides adequate maintenance, inspection access and work space. Where access is required for adjustment, cleanout, inspection of maintenance and such access is not otherwise available, access panels shall be furnished and installed. Panels shall be selected by the Architect.

3.14 BUILDING OPENINGS FOR ADMISSION OR INSTALLATION OF EQUIPMENT

A. The Contractor shall ascertain from his examination of the Architectural and Structural Drawing whether any special temporary or permanent openings in the building for the admission or installation of apparatus furnished under this Contract will be necessary and he shall notify the General Contractor accordingly. He shall pay all cost of making such openings in case of failure to give this notification in time for the General Contractor to arrange for same during construction.

3.15 CUTTING, SLEEVES, INSERTS, ANCHOR BOLTS AND ESCUTCHEONS

A. In placing sleeves, inserts, anchor bolts and any other material, the Contractor shall cooperate with all other trades and shall consult with the Architect in regard to their exact location whenever there is any interference with structural members.

B. The Contractor will be held responsible for locating and maintaining in proper position, sleeves, inserts and anchor bolts supplied and/or set in place by him. In the event that failure to do so requires cutting and patching of finished work, it shall be done at the Contractor's expense.

C. All pipe passing through floors, walls or partitions shall be provided with sleeves having an internal diameter 1" larger (unless specifically indicated otherwise) than the outside diameter of the pipe. All holes cut in floor panels shall be core drilled.

D. Sleeves through outside walls shall be Schedule 40 black steel pipe. Sleeves shall extend 1/2' beyond each side of the wall. The space between the sleeve and the pipe shall be packed and made water tight with a waterproof compound.

E. Sleeves through masonry floors, interior masonry walls, or fire walls shall be Schedule 40 steel pipe set flush with finished wall or ceiling surfaces, but extending 2" above finished floors.

F. Sleeves through interior partitions shall be 22 gauge galvanized sheet steel set flush with finished surface of partitions.

G. Inserts shall be individual or strip type of pressed steel construction with accommodation for removable nuts and threaded rods up to 3/4" in diameter, permitting lateral adjustment. Individual inserts shall have an opening at the top to allow reinforcing rods to be passed through the insert body and shall be similar to Fee and Mason Fig 188 or equal for equipment suspension and Fig. 9000 or equal for pipe suspension.

H. Where sleeves or inserts are placed in interior walls or partitions, the openings shall be completely sealed with Fiberglass to prevent sound transmission. Where sleeves are placed in fire rated walls, they shall be packed with high temperature mineral wool and non-flammable sealant.

I. Furnish and install escutcheons where uninsulated pipes pass through finished walls, floors or ceilings. Escutcheons shall be chrome plated brass, firmly secured to the pipes and of sufficient outside diameter to amply cover the sleeved openings for the pipes. Escutcheon plates shall be as manufactured by Crane Company or equal.

END OF SECTION

DIVISION 16000
SECTION 16010
BASIC ELECTRICAL REQUIREMENTS

1.01 GENERAL

A. The General Conditions, Special Conditions, and instructions to Bidders are part of this Division of the Specifications and shall be consulted as to detail as they apply to all work in this Division of the Specifications.

1.02 DRAWINGS AND SPECIFICATIONS

A. All drawings and specifications on the project are complementary, each to all other sets, and they shall be used in combination for the execution of this work. Mechanical work shown on any of the contract drawings or any section of the contract specifications, shall be considered as included in this work unless specifically excluded by inclusion in some other branch of the work. This shall include roughing-in for connections and equipment as called for or inferred. The Contractor shall check all drawings and specifications for the project and shall be responsible for the installation of all electrical work.

B. The contract drawings for mechanical work are in part schematic, intended to convey the scope of work and indicate the general layout, design and arrangement. The Contractor shall follow these drawings in the layout of his work and shall consult general construction drawings, mechanical drawings and all other drawings for this project to determine all conditions affecting the electrical work. The contract drawings are not to be scaled and the Contractor shall verify spaces in which the electrical work is to be installed.

C. Where specific details and dimensions for mechanical work are not shown on the drawings, the Contractor shall take measurements and make layouts as required for the proper installation of the work and coordination with all other work on the project. In case of any discrepancies between the drawings and the specifications that have not been clarified by addendum prior to bidding, it shall be assumed by the signing of the contract that the higher cost (if any difference in costs) is included in the contract price, and the Contractor shall perform the work in accordance with the drawings or with the specifications, as determined and approved by the Architect, and no additional costs shall be allowed by the contract price.

1.03 WORK INCLUDED

A. This work shall include all plant, labor, material and equipment as required to furnish and

install electrical work including demolition as shown on drawings and as hereinafter specified. Work shall also include all labor, material and equipment not shown on drawings and not specified but necessary and reasonably incidental to comply with the intent of contract to provide first class and complete installations of electrical work. Furnish and install all materials, equipment, devices, and accessories not specifically called for by item but that are necessary to provide the requirements in operation and function that is established by the design and by the equipment specified.

B. Work shall also include: (1) All hoists, scaffolds, staging, runways, and equipment required for the performance of the work; (2) All job measurements and shop layouts required for the proper installation of material and equipment included in the work; (3) All lights, guards, and signs as required by safety regulations applicable to the work; (4) The removal from the premises, as it accumulates, of all dirt and refuse resulting from the performance of the work; and (5) Modifications to existing structure, equipment and installations required in order to install new work; (6) Demolition Work.

C. Work shall include providing labor and equipment for current and voltage readings, and adjustments required on electrical equipment for testing and balancing of mechanical systems as specified in Section Division 15 of this specification.

1.04 EXISTING CONDITIONS

A. Each bidder shall inspect the site as required for knowledge of existing conditions and failure to obtain such knowledge shall not relieve the successful bidder of the responsibility to meet existing conditions in performing the work under the contract.

B. Existing conditions indicated on the drawings are taken from the best information available on previous contract drawings and from visual site inspection and are not to be construed as "As-Built" conditions, but are to indicate the intent of this work. It shall be the responsibility of the Contractor to verify all existing conditions and the intent of this work indicated.

1.05 CONDUCT AND SEQUENCE IN PERFORMING WORK

A. The Contractor shall be responsible for a scheduled sequence in performing the work so that it will not interfere with the Owner's operation in the existing building. Before any work is started, the Contractor shall consult with the Owner's Representatives and arrange a satisfactory schedule. Make temporary alterations as required to execute work so that all operations and services in the existing building are maintained with the minimum possible interruption. Temporary shut-downs shall be segregated and shall be of the shortest possible duration. All facilities shall be kept in continuous operation unless specific permission to the contrary is arranged by the Owner's Representative.

1.06 MATERIAL AND MANUFACTURER

A. All material and equipment shall be new except as stated otherwise; shall be of the best quality and design; shall be free from defects and imperfections and shall have markings or a nameplate identifying the manufacturer and providing sufficient reference to establish quality, size and capacity. As possible, all material and equipment of the same type shall be of the same manufacturer. Equipment shall function and perform efficiently and quietly at the required capacity without producing objectionable noise within the occupied areas of the building; if not, the Contractor shall remedy the condition or replace the equipment at no additional cost to the contract.

1.07 SUBSTITUTIONS

A. Reference in the specifications to any article, device, product, material, fixture, equipment, form or type of construction by name, make or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition. Any article, device, product, material, fixtures, equipment, form or type of construction other than those specified may be substituted for consideration, in accordance with the preliminary matters, general conditions, and supplemental conditions as applicable unless otherwise specified.

1.08 LABOR, WORKMANSHIP AND SUPERVISION

A. All labor for the installation of material and equipment furnished under the electrical work shall be done by experienced mechanics of the proper trade and all workmanship shall be first class and in compliance with the specific requirements of drawings and specifications.

B. All material and equipment for the electrical work shall be installed under competent supervisory service furnished by the Contractor. Where necessary, this shall include the services of special technicians and operation personnel.

1.09 SAFETY REGULATIONS

A. All electrical work shall be performed in compliance with all applicable and governing safety regulations including the regulations of the Occupational and Safety Health Act. All safety lights, signs and guards required for performance of electrical work shall be provided by the Contractor.

1.10 CODES, ORDINANCES, REGULATIONS AND U.L. APPROVAL

A. See General Conditions

B. Laws, codes, ordinances and regulations shall take precedent excepting only where the work called for by the drawings and specifications exceeds by quality and quantity.

C. Fixtures, appliances, equipment and materials which are subject to Underwriter's Laboratory tests shall bear such approval.

1.11 CONTRACTOR'S EQUIPMENT

A. All hoists, scaffolds, staging, runways, tools, machinery and equipment required for the performance of the electrical work shall be furnished by the Contractor.

1.12 STORAGE AND PROTECTION

A. Material and equipment for the electrical work shall be protected from dirt and damage and maintained in a clean condition during the performance of the work. This shall include adequate protection from the weather if storage is outside. All parts of material and equipment that have become rusted or damaged shall be replaced or restored to an acceptable condition as approved by the Owner's Representative. This shall include factory finishes damaged during construction.

1.13 CLEANING

A. Dirt and refuse resulting from the performance of the work shall be removed from the premises as required to prevent accumulation and the Contractor shall cooperate in the maintenance of reasonably clean premises at all times.

B. Immediately prior to the final inspection, Contractor shall clean all material and equipment. Dirt, refuse and stains shall be removed from all surfaces and damaged finishes restored to original condition.

1.14 OPERATION AND MAINTENANCE INSTRUCTION

A. This Contractor shall furnish all services as required for adequate verbal and printed instructions the Owner's operating and maintenance personnel for operation and maintenance of all equipment and systems installed under this Division. Three complete copies of service manuals in hardback binders shall be furnished at the end of the project in accordance with the General Conditions of the specifications. The manuals

shall include warranties, printed operating and maintenance instructions for systems and equipment specified under this Division, all approved shop drawings, all manufacturer's printed data, parts lists control diagrams, valve schedules, parts lists, list of equipment suppliers, list of Contractors & Subcontractors, balancing reports, test reports.

B. When the work is complete and at a time designated by the Owner's Representative, the Contractor shall furnish the services of a qualified instructor to instruct Owner's operating and maintenance personnel in the operation and maintenance of the systems and equipment furnished and installed under this Division.

C. The bound copies of the operating and maintenance manuals shall be used during the verbal instructions.

1.15 MOTORS, CONTROLS, AND OTHER EQUIPMENT

A. Except as otherwise specified, the electrical work shall include receiving, installing and mounting all detached motors, switches, motor control equipment and other control devices furnished under other divisions or work. Contractor shall check all headings of specifications for equipment to be installed. Work shall include overload heater for motor starters, mountings and supports as required for all equipment, including angle frames, steel plates, bars, bolts, etc., and all conduit, wire, etc., as required to connect all equipment including motors, disconnect switches, starters, controls, pushbuttons, etc. Detached motors shall be set and aligned with coupling or drive. Motor connections shall be terminated with unexposed leads in suitable condulet and cover. Conduit shall terminate close to motor with a minimum of 12" of flexible liquid tight conduit between rigid conduit or EMT and motor.

B. Unless specified otherwise, perform all work required to rough-in and connect to all equipment requiring electrical connections. This work shall be as indicated on drawings, by approved equipment shop drawings and by direction on the job.

C. All equipment, materials or devices furnished by others including that furnished by the Owner or under any other division which require electrical connections shall be roughed-in and connected under this division, unless specified otherwise. It shall be the Contractor's responsibility to verify exact requirements for rough-in and connection of equipment furnished by others prior to installation. Extras will not be allowed for failure to verify same.

D. The Contractor shall run feeders to starters, disconnects, control panels and motors as shown on drawings, make connections, furnish overload heaters for motor starters, and install and wire all mechanical components in accordance with wiring diagrams furnished under mechanical work. The Contractor shall coordinate with any other trades

involved for the proper coil voltages for control of magnetic starters and contactors.

1.16 ADJUSTING, ALIGNING AND TESTING

A. All electrical equipment furnished under this Division shall be adjusted and tested by this Contractor. Motors and other equipment furnished by others, to which electrical connections are made under this Division, shall be checked for short circuit and open circuits before energizing. Motors shall be checked for proper phasing and rotation. The thermal overload protection shall be checked in all motor starters, and any protector heaters found to be of improper size as required by the motor name plate full load amperage and voltage rating for protection of the motor shall be listed (include equipment designation, rating of heater, motor nameplate horsepower, full load amps and voltage) and 4 copies of list shall be submitted to the Owner's Representative.

B. Mechanism of all electrical equipment shall be checked, adjusted and tested for proper operation. Protective devices and parts shall be checked and tested for specified and required application and adjusted as required. Adjustable parts of all lighting fixtures and electrical equipment shall be checked, tested and adjusted as required to produce the intended performance.

C. Completed wiring systems shall be free from short circuits and after completion, perform tests for insulation resistance in accordance with the requirements of the National Electrical Code.

D. The Contractor shall be held responsible for the operation, service and maintenance of electrical equipment during construction and prior to acceptance by the Owner. All electrical equipment shall be maintained in the best operating condition. Operational failure caused by defective material and/or labor furnished under this Division shall be immediately corrected. Owner's Representative shall be immediately notified of any operational failures caused by defective material and/or labor covered under other Divisions or furnished by others.

1.17 ELECTRICAL CIRCUITRY FOR EQUIPMENT

A. The electrical circuits, components, and controls for all equipment are selected and sized, based on the equipment as furnished. It shall be the responsibility of all parties concerned, involved in, and furnishing the substitute and/or equivalent equipment to verify and compare the electrical characteristics and requirements of that furnished to that specified and/or shown. If greater capacity or more materials or labor is required for the rough-in, circuitry or connections than for the item specified and provided for, then it shall be the responsibility of the parties involved in providing the substitute and/or equivalent items of equipment to provide all compensation for additional charges made

for the proper rough-in, circuitry and connections for the equipment furnished. No additional charges shall be made to the Base Bid price or to the Owner.

B. Before rough-in of circuitry or connecting to equipment, the Contractor shall verify the electrical characteristics and requirements of the equipment being furnished, and for that specified and shown on drawings.

1.18 CLEARANCES

A. All electrical equipment shall be so installed to maintain proper clearance and headroom as required by the National Electrical Code.

1.19 CUTTING AND PATCHING

A. The Contractor shall coordinate with the Owner's Representative before any cutting and obtain approval from the Owner's Representative prior to any cutting. All patching and finishing shall be by the General Contractor.

B. Cutting shall be done with extreme care and in such a manner that the strength of the structure will not be endangered. Wherever possible, openings in concrete or masonry construction shall be by concrete saw or rotary core drill. Openings in any construction shall be cut the minimum size required for the installation of the work. Adequate protection shall be provided to prevent damage to adjacent areas and to prevent dust from spreading to adjacent areas.

C. Where openings or holes are cut in existing construction and the cutting breaks existing electrical circuitry or control circuitry conduit and wiring, then it shall be the responsibility of the Contractor to reroute the circuitry conduit and requiring and to complete the circuitry as required and as approved by the Architects. Temporary completion shall be provided where necessary before the permanent rerouting and completion work is finished.

D. Before any cutting, patching, or finishing work is started, dust and moisture protection shall first be installed as required in these specifications.

E. Openings cut in floor shall be cut by core drilling where possible. After work is installed through any opening in floor, the opening around the work shall be patched and sealed watertight with epoxy or silicone based, non-cracking elastomeric sealant.

F. Where existing work is removed from sleeves or openings through floor and the sleeve or opening is not to be reused, patch the hole or opening by filling with shrink epoxy

cement grout, in strict accordance with the grout manufacturer's instructions and recommendations and as required to make completely watertight and fireproof. Finish the floor surface as directed by the Owner's Representative.

1.20 SHOP DRAWINGS AND SAMPLES

A. Acceptance of the work shall be subject to the Architects approval of shop drawings, product data and samples, as specified in the "General Conditions" of these specifications.

B. Submittals shall include the manufacturer's model number, capacity, performance data, electrical characteristics, etc., all clearly shown and marked for the specific item of equipment to be furnished on this project. General catalog data that does not indicate the specifics for the item to be furnished for this project will not be accepted. Performance data shown or marked on the submittals shall be at the actual specified operating conditions for this project.

1.21 IDENTIFICATION, INSTALLATION AND USE OF ELECTRICAL EQUIPMENT

A. All electrical equipment shall be furnished with factory identification for the suitability of use and installation, either by a description marked on the equipment, permanently attached label, or printed description packed with the equipment, in accordance with article 110 of the National Electrical Code (NEC). If a printed description is packaged with the equipment, this shall be bound in the Operation and Maintenance Manuals.

1.22 NOISE AND VIBRATION

A. Contractor shall be responsible for the installation of all equipment in such a manner as to control the transmission of noise and vibration for many installed equipment or system, so the sound level shall not exceed NC35, in any occupied space. Contractor shall be responsible for the correction of any objectionable noise in any occupied area due to improperly installed equipment.

1.23 EQUIPMENT IDENTIFICATION AND LABELS

A. All electrical equipment, such as disconnect switches, motor starters, controls, push-button, panelboards, and other similar items shall be adequately identified with labels. Labels shall clearly designate name and use of equipment. Labels shall be laminated plastic with 1/4" white letters on a black background. Labels shall be attached with pop-rivets or permanent adhesive. "Dymo" type labels not acceptable.

1.24 WARRANTIES

A. Warranties shall be provided for all equipment in accordance with the requirements of the General Conditions, except that all warranties shall be non-prorated for one year.

B. Acceptance of the work under this Division shall be subject to the conditions that all installed systems, equipment, apparatus, and appliances included in the work shall operate and perform as designed, including code clearances, and as selected with respect to efficiency, capacity and quietness and shall operate and perform without producing objectionable noise within occupied areas of the building.

C. Acceptance of the work shall also be subject to the conditions that any time within one year after date of acceptance final payment, any defective part of the work resulting from the supply of faulty workmanship or material shall be immediately amended, required or replaced as a part of the contract work without cost to the contract.

PART II - PRODUCTS

2.01 NONE

PART III - EXECUTION

3.01 NONE

END OF SECTION

DIVISION 16000
SECTION 16050
BASIC ELECTRICAL MATERIALS & METHODS

PART I - GENERAL

1.01 RELATED DOCUMENTS

A. The General Conditions, Special Conditions, and instructions to Bidders are part of this Division of the Specifications and shall be consulted as to detail as they apply to all work in this Division of the Specifications.

1.02 CONDUIT AND INSTALLATION

A. Rigid threaded conduit, threaded intermediate conduit and electrical metallic tubing shall be standard size of approved manufacturer and shall be galvanized or sherardized on inside and outside, including with water-tight compression fittings or with concrete-tight, pressure cast set screw type fittings. Rigid threaded conduit and threaded intermediate conduit shall be installed with threaded couplings and fittings.

B. All conduit may be electrical metallic tubing (E.M.T.), except conduit larger than 4", conduit in wet or damp locations, conduit in hazardous locations, conduit in earth or below grade, and except as otherwise noted on drawings or specified otherwise. Conduit shall be minimum 3/4' dia., except switch legs and control wiring may be minimum size.

C. Galvanized steel rigid or intermediate grade (I.M.C.) conduit shall be used in wet or damp locations, in NEC classified hazardous locations and for conduit sizes larger than 4" except below grade outside of building. Aluminum conduit may not be used.

D. Short sections of flexible conduit may be used from junction or outlet boxes to lighting fixtures as permitted by the National Electrical Code. Connections from outlet boxes above ceilings to fluorescent fixtures recessed in ceiling shall be made with flexible steel conduit not to exceed 6 ft. in length.

E. Short sections of flexible watertight (Sealtite) conduit shall be used for connections to motors, transformers and vibrating type equipment.

F. Unless specified or noted on drawings otherwise, conduit shall be installed concealed, excepting in areas where concealment of conduit is not possible or practicable and is approved by the Architect. Conduits shall be installed continuous between outlets, boxes, cabinets, etc.

G. Conduits installed exposed to view (not concealed by finish) shall be run parallel and perpendicular to building lines and shall be run against the structure in a neat workmanlike manner with conduit offsets neatly formed around all structure offsets and obstructions.

H. Conduits shall be securely fastened in place with approved type hangers, clamps and supports. Conduit shall not be fastened to or supported from ductwork, piping, lay in ceiling support wires or mechanical equipment. Conduit ends shall be reamed before installation and all conduit shall be thoroughly cleaned before installation and kept clean after installation. All conduit shall be fished clean before pulling of wires. Plug ends of conduits, with temporary plugs, where conduits are open to weather and before concrete is poured to keep inside of conduit free of water and concrete.

I. Exposed conduits shall be securely fastened in place on intervals in accordance with the NEC, and hangers supports and fastenings shall be provided at each elbow, at the end of each straight run terminating at a box or cabinet, and adjacent to each outlet.

J. Horizontal and vertical conduit runs 2-1/2" and smaller may be supported by one hole malleable straps, clampbacks or devices with suitable bolts, expansion shields or beam-clamps for mounting to building structure.

K. Adjustable hangers may be used to suspend 3" or larger conduits when separately located.

L. Hangers shall be suitable for the application involved. Where excessive corrosive conditions are encountered, hanger assemblies shall be protected after fabrication by sherardizing or galvanizing, special paint or other suitable preservative methods.

M. Use of perforated iron strap, cord or wire for supporting conduits will not be permitted.

N. The required strength of the supporting equipment, size and type of anchors shall be based on the combined weight of conduit, hanger and cables.

O. Install pull wire or pull string in all unused empty conduits.

1.02 OPENINGS AND SLEEVES

A. The Contractor shall furnish and install all box-outs and sleeves for openings required to install this work. Openings through structural members shall be only as approved by the Architect or as shown on the structural drawings. Openings through concrete walls and

floors shall be core drilled. Openings through masonry walls shall be galvanized steel conduit sleeves.

1.03 ACCESS DOORS

A. Where junction boxes and equipment are installed in concealed spaces, access doors shall be installed infurring to provide for operation, service, inspection, and maintenance.

B. Access doors shall be Milcor style K, M, DW, or AT as required by construction, equivalent Zurn or Wade, flush type steel units with frames. Construction shall be of #14 gauge level stock, cadmium plated and fitted with pivot hinges and screwdriver coin type lock and finished with prime coat of paint. Panels shall have a minimum size of 12" x 12" for handholes and 18" x 18" for manholes.

C. Accessible ceilings with removable type ceiling tiles do not require access panels to be installed.

1.04 WIRES AND WIRING FOR 600 VOLT OR LESS

A. Wires and cables shall be insulated soft annealed copper conductors with 600 volt insulation unless noted or specified otherwise and shall be listed and approved by Underwriter's Laboratories and shall meet all specifications of the IPCEA and NEMA Standards. Gauge of wire shall be (AWG) gauge. No. 10 gauge and smaller shall be solid conductor or stranded conductor. No. 8 gauge and larger shall be stranded conductor, except all ground wires shall be stranded. Stranded conductors shall not be fastened directly under screw terminals that rotate against conductors (such as side screw terminals of wall switches and convenience receptacles). Wire smaller than No. 12 gauge shall not be used unless specifically called for on drawings or in specifications. Aluminum wiring shall not be used.

B. Unless specified otherwise, 600 volt wires in general use shall be type "THHN", "XHHW" or "THWN" for sizes through #3 and "THHN" for sizes #2 and larger except wires run in fluorescent fixture channels shall be type "XHHW" or type "THHN".

C. Grounding wires shall be stranded copper with 75 degrees C. "THHN", "XHHN", or "THWN" insulation with green color or green tracer. Every branch & feeder conduit shall contain a code sized green insulated ground conductor.

D. Wire insulation shall be color coded as follows:

120/208 VOLT
Phase A - Black
Phase B - Red
Phase C - Blue
Neutral - White
Ground - Green

E. Control and indication wiring shall be #14 AWG type "THHN", except runs greater than 200 feet in length shall be #12 AWG unless noted otherwise on drawings.

F. Conductors used where low leakage type is required, such as for ground fault protected circuits, the insulation shall be type "XHHW".

G. All wires shall be run in conduit and shall be continuous between outlets and boxes. At least 8" of wire shall be left at outlets for fixture connections.

H. All terminations and splices shall be made in accordance with proper methods and recommendations for the type of wire and devices used and as recommended by the manufacturers of material and equipment involved.

I. Splice and Terminal Materials: Splices for 600 volt conductors smaller than No. 8 AWG shall utilize twist type insulated spring connectors. Terminals or splices for stranded conductors No. 8 AWG and larger shall utilize indent, hex screw, or bolt clamp-type connectors, with or without tongue, properly taped, and approved for the particular ap plication. Exposed splice connector device shall be insulated with a minimum of two half-lapped layers of specification grade rubber insulating type and a minimum of two half lapped layers of polyvinyl chloride electrical tape applied over the rubber tape. The polyvinyl chloride type shall extend a minimum of two cable diameters over the cable jacket. For cable size 250 MCM and larger, connectors shall have at least two clamping elements or compression indents, and shall have at least two clamping elements or compression indents, and shall have provision for at least two bolts for joining to apparatus terminals. All wire and cable connectors shall be of high conductivity corrosion resistant material and have actual contact area equal at least to the current carrying capacity of the wire or cable.

J. Crimping Hand Tools used in securing the conductor in the compression type connectors or terminal lugs shall be those made for the purpose and for the conductor sizes involved. The crimping tools shall be of the ratchet type which prevents the tool for opening until the crimp action is completed. Such tools shall be a product of the

connector manufacturer.

K. Insulating Compounds and Tapes for splice and termination insulation shall be of a type approved by the cable manufacturer for the particular use, location, and voltage.

L. Where wire size is shown on drawings or specified it shall be the same size throughout the circuit.

1.05 OUTLET BOXES, JUNCTION BOXES, PULL BOXES AND LOCATION OF OUTLETS.

A. Outlet boxes shall be installed for all electrical service outlets, including plug receptacles, lamp receptacles, lighting fixtures, switches, etc. Boxes for concealed work shall be size 4" code gauge steel knockout boxes, galvanized or sherardized and of required depth for services and devices. Boxes installed for concealed work shall have code gauge galvanized raised plaster rings set to plaster ground or markers with outside edge flush with plaster or wall finish. Plaster rings shall be selected with proper opening for device installed in box. Thru-wall type box will not be permitted. Outlet boxes in unplastered concrete block walls in finished rooms shall be masonry type and shall be set to line with wall joints.

B. Boxes for exposed work, where permitted or approved, shall be 4" square or 4" long by 2-1/8" wide standard utility boxes specifically designed for surface installation and as required by device, wiring, and number of conduits and all covers for devices and blank covers shall be stamped steel with turned down edges to fit with sides of box.

C. Pull and junction boxes shall be code gauge galvanized steel boxes of size shown or required and with bolted or screwed covers. Boxes shall be flush or surface mounted as shown or required and shall be finished with factory prime coat of paint.

D. All rigid threaded and intermediate threaded conduit shall be clamped to boxes and enclosures with bushing inside of box and locknut outside of box. Bushings and locknuts shall be galvanized malleable iron. EMT shall be clamped to boxes and enclosures with fittings designed for EMT connections to boxes, and the fittings shall be tightly secured to the EMT and shall be clamped to box with locknut inside of box. Open end of fitting inside of box shall be smooth to prevent damage to conductor insulation when pulling conductors.

E. Location of outlets on drawings is approximate and, except where dimensions are shown, exact location of outlets shall be as taken from plans and details on general drawings or as directed by the Engineer. Outlets shall be located generally from column centers and finished wall lines or to center of acoustical and decorative ceiling panels and to centers of joints of wall panels. Outlets shall be in stalled in accessible location

and no outlets shall be installed above ducts, behind furring or other obstructions. Outlets below ducts shall be connected with extension connections to outlets in ceiling or slab above.

F. Switch outlets, convenience receptacle outlets and telephone outlets, unless shown otherwise or required otherwise by wainscots, counters, etc., shall be mounted at height as specified under the device heading in this specification. Each device shall be carefully aligned to center vertically on other devices that are installed in the same vicinity on wall.

1.06 LIGHTING CONTROL SWITCHES

A. General use wall switches throughout, unless specified otherwise, shall be HUBBELL or equivalent Arrow-Hart, General Electric, Sierra, Circle F, Bryant or Pass & Seymour, specification grade, quiet operating for A.C. inductive loads and with side screw terminals, and backwiring screw-clamp type terminals. Stranded conductors shall not be directly terminated under side screw terminals that rotate against the conductors. Groups of switches shall be installed under one-piece plate. Switches, where indicated on drawings, shall be key operated type; all others shall be toggle handle type. Switches shall be mounted with centerline 3'-10" above floor unless otherwise noted on drawings. Color as selected by Architect.

Single Pole	#1221-GRY	20 amp - 120/277 volts
Three Way	#1223-GRY	20 amp - 120/277 volts
Momentary	#1556-GRY	15 amp - 120/277 volts

1.07 RECEPTACLES

A. Receptacles, unless specified or shown otherwise, shall be Hubbell #5362, equivalent Arrow-Hart, General Electric, Circle F, Sierra, Bryant or Pass & Seymour, 3 wire grounding type, NEMA configuration 5-20R, duplex receptacle rated 20 amps @ 125 volts. Receptacles shall have automatic grounding clip on receptacle mounting ear and shall have side screw terminals and back-wiring screw-clamp type terminals including grounding terminal. Stranded conductors shall not be mounted directly under binding screws without clamp-type terminals. Receptacles shall be mounted in wall with centerline 12" above finished floor unless noted otherwise on drawings or unless required to be higher by counters, wainscots, etc.

B. Special receptacles shall be as required for load served.

1.08 DEVICE PLATES AND BLANK PLATES

A. Wall plates for switches and receptacles in flush wall boxes shall be .040" thick beveled-edge, satin-finished stainless steel. Plates for devices in exposed boxes shall be stamped steel with turned down edges to fit side of box.

B. Blank plates on boxes in finished spaces shall be stainless steel or brass as specified to match receptacle and switch plates. Blank plates on flush boxes in unfinished spaces, shall be flat galvanized steel. Plates for surface mounted boxes shall be galvanized stamped steel with turned down edges to fit side of box.

PART II - PRODUCTS

2.01 NONE

PART III - EXECUTION

3.01 NONE

END OF SECTION