

3. Length: 3" less than stair width.
4. Width: 4".
5. Anchors: Wing anchor. All fasteners shall be bronze.

2.6 FABRICATION:

- A. Form work true to line and level with accurate angles and surfaces and straight, sharp edges. Ease exposed edges to radius of approximately 1/32". Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- B. Weld corners and seams continuous and in accord with AWS specifications. Grind exposed welds smooth and flush, to match and blend with adjoining surfaces and without weakening base metal. Remove slag from welds before applying shop primer.
- C. Formed components: Molded, bent or shaped members shall be formed with clean, sharp arrises, without dents, scratches, cracks and other defects.
- D. Provide anchorage of type shown on approved shop drawings, coordinated with supporting structure.

2.7 PROTECTIVE COATINGS:

- A. Shop primer: Ferrous metal, except galvanized surfaces, shall be cleaned and given one shop coat of shop primer as specified herein:
 1. Surface preparation: Clean surfaces after fabrication and immediately prior to shop painting in accord with SSPC-SP3, "Power Tool Cleaning" or SSPC-SP6, "Commercial Blast Cleaning".
 2. Shop priming:
 - a. Shop prime all steel components.
 - b. Shop prime surfaces after completion of fabrication.
 - c. Apply specified shop primer in accord with manufacturer's product data and SSPC Painting Systems Specifications to provide a dry film thickness of 2.5 mils.
 - d. Coat fabrications and anchors to be built into masonry construction using bituminous coating, 15 mils dry film thickness.
 - e. Apply shop primer within four hours after cleaning and before rust-bloom occurs. Paint only in relative humidity below 85 percent and surface temperatures of five degrees F. above dew point.
 - f. Where galvanized or zinc-coated metal is specified, metal shall not be shop primed.
- B. Galvanizing:
 1. Hot dip galvanizing applied to products fabricated from rolled, pressed and forged steel shapes, plates, bars and strips or zinc coatings on assembled steel products shall comply with ASTM A123-02, Grade 65.

2. Hot dip galvanizing applied to products fabricated from steel sheet shall comply with ASTM A653-06a, coating Designation G90.
3. All galvanizing shall be done after fabrication.
4. Preparation: Prior to galvanizing, remove dirt, scale, rust, oil, grease and similar debris, including residue resulting from welding and fabrication, by pickling or blasting. Clean, flux and dry materials prior to galvanizing.
5. Following galvanizing, remove roughness, dross, blisters, lumps and runs. Immediately coat bare steel with cold galvanizing compound.
6. Following galvanizing, surfaces to be painted shall be chemically treated for bond in accord with ASTM D2092-95(2001)e1, Method A.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Inserts and anchorages: Furnish inserts and anchoring devices which must be set in concrete for installation of work.
- B. Coordinate setting drawings, diagrams, templates, instructions and directions for installation of anchorages, such as concrete inserts, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete construction.
- C. Shop assembly: Preassemble items in shop to greatest extent practicable to minimize assembly at project site. Disassemble units only to extent necessary for shipping and handling limitations. Mark units for reassembly.
- D. Where galvanized components must be field welded to supports, remove galvanizing prior to welding.

3.2 INSTALLATION:

- A. Fastening to in-place construction: Provide anchorage devices and fasteners to secure to in-place construction; including threaded fasteners for concrete inserts, toggle bolts and through-bolts.
- B. Cutting, fitting and placement: Perform cutting, drilling and fitting to install work. Set work in location, alignment and elevation, plumb and level, true and free of rack, measured from established lines and levels. Install work in accord with approved shop drawings.
- C. Fitting: Fit exposed connections to form hairline joints. Field weld connections which cannot be shop welded. Grind joints smooth.

- D. Railings:
1. Adjust steel railings prior to securing in place to ensure proper matching at abutting joints and correct alignment throughout length. Plumb posts in each direction.
 - a. Set posts in sleeves in concrete using anchoring cement as specified in Mortar and Masonry Grout section.
 - b. Weld railings to steel construction. Grind smooth.
 2. Secure handrails to walls using wall brackets providing clear space between handrail and wall of 1-1/2". Attach brackets to drywall and masonry construction using toggle bolts; concrete construction using expansion fasteners.
- E. Stair nosings: Anchor stair nosings to stair treads with wing anchors spaced 3" maximum from each end of nosing and at 1'-0" o. c., maximum, along length. Attach with flat-head machine screws. Finished installation shall be level with stair tread.
- F. Repair of galvanized surfaces: After installation, clean surfaces from which galvanizing was removed during installation in accord with SSPC-SP 3, "Power Tool Cleaning." Coat surfaces with cold galvanizing compound in accord with ASTM A780-01(2006) to achieve a minimum 3.0 mils dry film thickness.
- G. Repair of primed surfaces: After installation, clean damaged areas in shop primer to the same standards as required for the shop coat and paint using identical primer.
- H. Field painting: For surfaces to receive field paint finish, prepare and paint in accord with the requirements of Painting and Coating section.

End of Section

SECTION 05 7050

CUSTOM METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY:

- A. Work of this section includes stainless steel counter tops.

1.2 SUBMITTALS:

- A. Submit shop drawings indicating sizes, shapes, fabrication and installation details. Submit product data. Submit 1'-0" long sample of each fabrication and assembly, finished as specified.
- B. Take field measurements prior to preparation of shop drawings and fabrication.

PART 2 - PRODUCTS

2.1 MATERIAL:

- A. Stainless steel: 14 gage stainless steel shall be AISI Type 304, #4 satin finish.
- B. Accessories:
 - 1. Structural steel: Meeting ASTM A36, hot-rolled plate and shapes; shop prime painted.
 - 2. Fasteners and anchors: Stainless steel.
 - 3. Provide inserts, sealants and other accessories required for a complete installation and compliance with code requirements.

2.2 FABRICATION:

- A. Factory fabricate components to greatest extent practicable.
- B. Form returns with sharp arrises; curved components with smooth radii.
- C. For components not to be factory welded, attach using concealed fasteners and with hairline joints.
- D. Countertops shall be continuous without visible joints.
- E. Provide 2" diameter holes, with finished edges, for wire management. Location shall be as directed by Architect.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install custom metal fabrications in accord with approved shop drawings and product data.

SECTION 06 1000

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY:

- A. Related work specified elsewhere:
 - 1. Concrete formwork.
 - 2. Architectural woodwork.
 - 3. Structural Insulated Panels.
 - 4. Gypsum board.
 - 5. Toilet partitions and accessories.

1.2 SUBMITTALS:

- A. Preservative-treated wood certification: Submit for Architect's information only. Submit certification by treating plant, stating chemicals and process used, net amount of salts retained, conformance with applicable standards and moisture content after treatment.
- B. Fire-retardant treatment certification: Submit for Architect's information only. Submit certification by treating plant that fire-retardant treatment materials comply with governing ordinances and that treatment will not bleed through finished surfaces.

1.3 QUALITY ASSURANCE:

- A. Applicable standards:
 - 1. ASTM International (ASTM), standards as referenced herein.
 - 2. Wood products; comply with the following standards published by the U. S. Department of Commerce, National Bureau of Standards:
 - a. Lumber: PS 20.
 - b. Construction and Industrial Plywood: PS 1.
 - 3. Preservative-treated wood: American Wood Preservers Association (AWPA); current standards, as referenced herein, shall apply to preservative-treated wood products.
 - 4. Plywood: APA The Engineered Wood Association (APA), current standards.
 - 5. Grading rules; current grading rules of the following associations apply as applicable to wood products:
 - a. Southern Pine Inspection Bureau (SPIB).
 - b. Western Wood Products Association (WWPA).
 - c. West Coast Lumber Inspection Bureau (WCLIB).
 - d. National Lumber Grades Authority (NLGA).
- B. Design standards; spans, connections and design criteria for members not otherwise indicated shall comply with the following:
 - 1. American Institute of Timber Construction (AITC), "Timber Construction Manual."
 - 2. American Forest and Paper Association (AF&PA).
 - a. "National Design Specifications for Wood Construction".

- b. "Design Values for Joists and Rafters".
 - c. "Span Tables for Joists and Rafters".
- C. Product identification:
- 1. Lumber: Lumber shall bear the grade stamp of a listed grading rules association certified by the Board of Review of the American Lumber Standards Committee (ALSC), identifying species or species combination, grade, moisture condition at time of surfacing, mill of origin and grading agency.
 - 2. Plywood: Plywood shall bear the stamp of the APA The Engineered Wood Association (APA), indicating type, grade, thickness, exposure durability, span rating, agency compliance, species group, edging, finish and glue type.
 - 3. Preservative-treated wood products: Preservative-treated lumber and plywood shall bear the quality standard stamp of the applicator, indicating preservative type, exposure conditions, year of treatment, treatment plant and treatment supervising agency.
 - 4. Fire-retardant-treated wood products: Fire-retardant-treated lumber and plywood shall bear the stamp of Underwriters Laboratories, Inc., (UL) or other approved independent inspection agency, indicating treatment type or name, flame spread and treatment plant.

1.4 DELIVERY, STORAGE AND HANDLING:

- A. Upon delivery to project site, place materials in areas protected from weather.
- B. Store materials a minimum of 6" above ground on blocking and cover with waterproof covering. Provide for air circulation and ventilation.
- C. Store no seasoned materials in wet or damp portions of building.
- D. Protect sheet materials from breaking corners and damaging surfaces.

PART 2 - PRODUCTS

2.1 LUMBER:

- A. Species and standards: Grade-stamped commercial softwood conforming to PS 20 and referenced grading rules, unless otherwise indicated.
- B. Seasoning: 19% maximum moisture content at time of building enclosure, unless otherwise noted.
- C. Surfacing: Surfaced four sides (S4S).
- D. Dimensions: Indicated lumber dimensions are nominal. Comply with PS 20.

- E. Plates, blocking, bracing and nailers: Utility Grade or #3 Southern Pine.

2.2 TREATED WOOD PRODUCTS:

A. Pressure-preservative-treated wood:

1. Treatment type: Water-borne preservative registered with EPA.
2. AWPA standard:
 - a. Lumber, timber and plywood shall conform to applicable requirements of AWPA Standard U1-07 and T1-07 for species, product and end use.
 - b. Handling and care of pressure treated wood products shall conform to AWPA Standard M4-06.
 - c. Preservatives shall conform to AWPA P5-07.
3. Preservative retention: As required by treatment type in accord with AWPA Standards for below- or above-ground use.
4. Seasoning; re-dry after treatment to 19% maximum moisture content.
5. Use:
 - a. Wood products in contact with concrete slabs-on-grade or foundations.
 - b. Nailers or blocking cast or built into concrete or masonry.
 - c. Wood products in contact with exterior walls.
 - d. Blocking, nailers, plates and similar wood products in conjunction with roof decks, roofing and roof parapets.

B. Interior fire-retardant-treated wood:

1. Acceptable product; subject to compliance with specified requirements:
 - a. Chemical Specialties, Inc., D-Blaze.
 - b. Hickson Corporation, Dricon.
 - c. Hoover Treated Wood Products, Pyro-Guard.
2. Description: Pressure-impregnated with a chemical retardant tested and listed by Underwriters Laboratories, Inc., (UL). When tested in accord with ASTM E84-07 treated products shall have a flame spread of 25 or less and show no evidence of significant progressive combustion when the test is continued for an additional twenty minute period. In addition, flame front shall not progress more than 10'-6" beyond centerline of burners at any time during test.
3. Surface burning characteristics: F.R.-S rating in accord with Underwriters Laboratories, Inc. (UL).
4. AWPA standard: AWPA U1-07, T1-07 and P17-02.
5. Seasoning; kiln-dried after treatment to the following maximum moisture content:
 - a. Lumber: 19%.
 - b. Plywood: 15%.
6. Hygroscopicity: Maximum 28% equilibrium moisture content when tested in accord with ASTM D3201-07 at 92% relative humidity.
7. Use: As required by codes.

2.3 HARDWARE:

- A. Provide nails, bolts, nuts, washers, screws, expansion bolts, clips, powder-actuated fasteners and similar hardware necessary for complete installation of rough carpentry items.
 - 1. Material and finish for use with non-pressure treated and fire-retardant-treated components shall be G90 hot dip galvanized steel or Type 304 stainless steel, except nails shall be hot dip galvanized.
 - 2. Material and finish for use with pressure-preservative-treated components shall be one of the following:
 - a. G185 hot-dip galvanized steel.
 - b. Type 316L stainless steel.

PART 3 - EXECUTION

3.1 WORKMANSHIP:

- A. Install wood framing and carpentry work cut square on bearings, fitted and set to required lines and levels, and secured in place.
- B. Lay out the work to provide correct openings to receive work of other trades.
- C. Preservative-treated wood:
 - 1. Prior to installation, brush-apply preservative to cut edges and ends of wood, using same type of preservative used for pressure treatment.
 - 2. Handle and install in accord with AWWPA standards.
- D. Fire-retardant-treated wood:
 - 1. Prevent exposure to water or moisture, and do not use if so exposed.
 - 2. Only end cuts shall be made. Do not rip or re-surface.
 - 3. Attach using only hot dip galvanized nails and anchors.
- E. Plates, blocking, nailers and miscellaneous framing:
 - 1. Provide 2" nominal thickness members to support and secure finishing materials, fixtures, accessories, partitions, specialty items and trim.
 - 2. Bolt to structural steel or metal framing at 4'-0" o. c., maximum.
 - 3. Secure to concrete and masonry using cast-in bolts, powder-activated stud, sleeve or wedge type anchors spaced at 4'-0" o. c., maximum.
 - 4. Provide anchors within 3" of ends of members.
 - 5. Provide linear runs in maximum practicable lengths, with joints in multiple members offset 3'-0", minimum.
- F. Site tolerances:
 - 1. Variation from plumb: 1/4" in 10'-0" height, non-cumulative,
 - 2. Variation from horizontal squaring diagonals: 1/2".
 - 3. Variation from indicated location of framing: $\pm 1/4"$.

4. Location of dimensioned openings: $\pm 3/8"$.
5. Variation from indicated rough opening size: $+1/4"$, $-1/8"$.

End of Section

SECTION 06 4000

ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY:

- A. Work of this section includes factory-fabricated woodwork as follows:
 - 1. Field paint finish woodwork.
 - 2. Plastic laminate finished millwork.
- B. Related work:
 - 1. Rough carpentry.
 - 2. Solid surfacing fabrications.
 - 3. Painting.

1.2 SUBMITTALS:

- A. Shop drawings: Submit for all architectural woodwork. Indicate construction and installation details, species and grades of materials, finishes, plastic laminate and cabinet hardware selections.
- B. Product data: Submit for cabinet hardware and similar manufactured items. Submit with shop drawings.
- C. Samples; submit as follows:
 - 1. Plastic laminate: Manufacturer's standard color and pattern selections for selection by Architect.
 - 2. Finish samples: Submit one sample of each type of selected finish on samples of species and grade material specified.
 - 3. Hardware items: Submit if requested by Architect. Samples will be returned to supplier.
- D. Fire-retardant treatment certification: Submit for Architect's information only. Submit certification by treating plant that fire retardant treatment materials comply with governing ordinances and that treatment will not bleed through finished surfaces.

1.3 QUALITY ASSURANCE:

- A. Applicable standards; comply with the following:
 - 1. Standards of the following, as referenced herein:
 - a. American National Standards Institute (ANSI).
 - b. APA The Engineered Wood Association (APA).
 - c. ASTM International (ASTM).
 - d. American Wood Preservers Association (AWPA).
 - e. Hardwood Plywood and Veneer Association (HPVA).
 - f. National Electric Manufacturers Association (NEMA).
 - g. National Fire Protection Association (NFPA).
 - h. Underwriters Laboratories, Inc., (UL).
 - 2. Wood products; standards of the U. S. Department of Commerce, National Institute of Standards and Testing:
 - a. Lumber: PS 20.
 - b. Construction and Industrial Plywood: PS 1.

3. Standards for architectural woodwork: Architectural Woodwork Institute (AWI), "Architectural Woodwork Quality Standards, Guide Specifications and Quality Certification Program," 2005 Edition, herein referred to as AWI Standards. Work shall comply with applicable portions of AWI standards.
- B. Grade marks: Identify lumber and plywood by official grade mark.
1. Lumber: Grade stamp shall contain symbol of grading agency, mill number or name, grade of lumber, species or species grouping or combination designation, rules under which graded where applicable, and condition of seasoning at time of manufacture.
 2. Plywood: Appropriate grade trademark of the APA. Indicate type, grade, class, identification index and inspection and testing agency mark.
 3. Fire-retardant-treated wood products: Fire-retardant-treated lumber and plywood shall bear UL stamp or stamp of other approved independent inspection agency, indicating treatment type or name, flame spread and treatment plant.
 4. On components to be exposed to view, grade marks shall be located so as to be concealed in finished work.
- C. Fabricator/installer qualifications:
1. Architectural woodwork shall be fabricated and installed by a single manufacturer.
 2. Fabricator/installer shall have at least five years successful experience in the fabrication, finishing and installation of architectural woodwork of the type and quantity required and, if requested by Architect, shall submit evidence of such experience.
- 1.4 DELIVERY, STORAGE AND HANDLING:
- A. Deliver no woodwork to project site until areas are ready for woodwork installation.
 - B. Immediately upon delivery to job site, place woodwork indoors, protected from weather.
 - C. Store woodwork a minimum of 6" above floor on blocking and cover with waterproof covering. Provide for air circulation and ventilation. Store in dry, conditioned space.
 - D. Wrap prefinished woodwork in black polyethylene for shipping and storage. Protect from sunlight exposure.
- 1.5 PROJECT CONDITIONS:
- A. Field measurements: Take field measurements to ascertain exact woodwork sizes. Indicate exact dimensions on shop drawings.
 - B. Install no interior woodwork until spaces are enclosed, dry and conditioned. Maintain temperature between 55 degrees F. and 80 degrees F. for 72 hours before beginning installation and afterwards until Date of Substantial Completion.

- C. Maintain interior relative humidity at the site between 25% and 55% before, during, and after installation.

PART 2 - PRODUCTS

2.1 BASIC MATERIALS:

- A. Lumber for opaque finish:
1. Species: Poplar.
 2. Lumber grade: II.
 3. Moisture content: 8-13%.
 4. Locations: As indicated on drawings.
- B. Medium density fiberboard:
1. Acceptable products:
 - a. Louisiana-Pacific, Southern FibrePine.
 - b. Masonite International Corp., Baraboard.
 - c. Medite of New Mexico, Industrial Grade Medium Density Fiberboard.
 2. Type: Meeting ANSI A208.2; Grade MD; Class "C" fire hazard classification for 3/4" thickness, made with binder containing no urea formaldehyde.
- C. Veneer-faced hardwood plywood: Sound Grade hardwood plywood, meeting ANSI/HPVA HP-1-2000, made with adhesive containing no urea formaldehyde resin.
- D. Hardboard: 1/4" thickness, tempered.
- E. Plastic laminates:
1. Acceptable products:
 - a. Formica Corp., Formica.
 - b. International Paper, Decorative Products Division, Nevamar.
 - c. Wilsonart International, Inc., WilsonArt.
 2. Conforming to NEMA Standard LD3-2005, as follows:
 - a. Horizontal applications: Grade HGL.
 - b. Vertical applications: Grade VGL.
 - c. Cabinet-liner: Grade CL-20.
 - d. Backing sheet: Grade BKL, undecorated plastic laminate.
 - e. Post-forming applications: Grade HGP.
 - f. Chemical resistant applications: Grade VGP.
 - g. Fire-resistant applications: Grade VGF.
 - h. Solid color applications: Grade HGS.
 3. Colors, textures and patterns: As selected by Architect from laminate manufacturer's standard full line selection.
 4. Provide abuse-resistant laminates for exposed portions of the work.
- F. Thermoset decorative melamine overlay: Melamine finish; matte surface texture. Color and pattern as selected by Architect from manufacturer's standard color selection.

2.2 ARCHITECTURAL CABINETS:

- A. Architectural cabinets shall comply with AWI Standards, Section 400.

- B. Plastic laminate clad cabinets:
 - 1. AWI quality grade: Custom.
 - 2. Panel core: Fire-retardant-treated particleboard or hardwood plywood.
 - 3. Finish on exposed surfaces: Plastic laminate as specified herein.
 - 4. Finish on semi-exposed surfaces: Thermoset decorative melamine overlay.
 - 5. Component edges: Plastic laminate faced.

- C. Tops:
 - 1. AWI quality grade; Custom.
 - 2. Plastic laminate:
 - a. Exposed surfaces: Plastic laminate.
 - b. Core: Medium density fiberboard or particleboard.
 - c. Non-exposed surface: Backing sheet.
 - 3. Solid surfacing: As specified in Solid Surfacing Fabrication section.

2.3 MISCELLANEOUS WOODWORK:

- A. Comply with AWI Standards as follows:
 - 1. Standing and running trim: Section 300, Custom Grade.
 - 2. Storage shelving: Section 600, Custom Grade.

2.4 TREATED WOOD PRODUCTS:

- A. Interior fire-retardant-treated wood:
 - 1. Acceptable product; subject to compliance with specified requirements:
 - a. Chemical Specialties, Inc., D-Blaze.
 - b. Hickson Corporation, Dricon.
 - c. Hoover Treated Wood Products, Pyro-Guard.
 - 2. Description: Pressure-impregnated with a chemical retardant tested and listed by Underwriters Laboratories, Inc., (UL). When tested in accord with ASTM E84-07 treated products shall have a flame spread of 25 or less and show no evidence of significant progressive combustion when the test is continued for an additional twenty minute period. In addition, flame front shall not progress more than 10'-6" beyond centerline of burners at any time during test.
 - 3. Surface burning characteristics: F.R.-S rating in accord with Underwriters Laboratories, Inc. (UL).
 - 4. AWPA standard: AWPA U1-07, T1-07 and P17-02.
 - 5. Seasoning; kiln-dried after treatment to the following maximum moisture content:
 - a. Lumber: 19%.
 - b. Plywood: 15%.
 - 6. Hygroscopicity: Maximum 28% equilibrium moisture content when tested in accord with ASTM D3201-07 at 92% relative humidity.
 - 7. Use: As required by codes.

2.5 HARDWARE:

- A. Door and drawer pulls:
 - 1. Acceptable products:
 - a. Epco, Inc., #MC-402/2-4.
 - b. Sugatsune America, Inc., #SST-30M.

- c. Stanley Works #4484, 4" long.
 2. Type: 4" long wire pull, stain stainless steel finish.
- B. Concealed hinges:
 1. Acceptable products:
 - a. Grass America, Inc., #3903.
 - b. Julius Blum, Inc., #71.6500 Series.
 - c. Sugatsune America, Inc., #H160-C.
 2. Type: 165 degree opening, self-closing.
- C. Recessed shelf standards and supports:
 1. Acceptable manufacturers:
 - a. Basis of design: Knape and Vogt Mfg. Co., #255 standard with #256 support.
 - b. Stanley Works.
 - c. Johnson Hardware, Inc.
 - d. Sugatsune America, Inc.
 - e. Hafele America Co.
 2. Type: Steel.
 3. Finish: Finish as selected by Architect.
- D. Shelf standards and supports:
 1. Acceptable manufacturers:
 - a. Basis of design: Knape & Vogt Mfg. Co., #80 standards with #180 brackets.
 - b. Capitol Hardware. Inc.
 - c. Garcy Corp.
 - d. Stanley Works.
 - e. Johnson Hardware, Inc.
 2. Type: Steel.
 3. Finish: Finish as selected by Architect.
- E. Side mount drawer slides:
 1. Acceptable products:
 - a. Basis of design: Accuride, #3832.
 - b. Grant Hardware Co., #5632.
 - c. Knape and Vogt Mfg. Co., #1429.
 2. Type: Full extension, steel ball bearing.
 3. Capacity: 100 lb. capacity:
- F. Cabinet drawer/door lock:
 1. Acceptable products:
 - a. Knape and Vogt Mfg. Co., #986.
 - b. Sugatsune America, Inc., #3310.
 - c. Timberline Supply, Ltd., Style CB-230 deadlock and Type 230 cylinder body with lock plug.
 2. Finish: Nickel-plated.
- G. Wire management grommet:
 1. Acceptable products:
 - a. Outwater Plastics, Inc., #31-2".
 - b. Sugatsune America, Inc., #V60-B.
 - c. Hafele America, Inc.
 2. Provide set including grommet, grommet cap and slot cover; color as selected by Architect from manufacturer's standard selection.

H. Fasteners: Provide bolts, nails, screws, toggle bolts and similar fasteners as indicated or required to attach and secure work.

1. Fasteners for trim shall be finishing nails for attachment to wood framing, trim-head screws for attachment to metal framing.
2. Material and finish for non-pressure treated and fire-retardant-treated components shall be G90 hot dip galvanized steel or Type 304 stainless steel, except nails shall be hot dip galvanized.
3. Material and finish for pressure-treated components shall be G185 hot-dip galvanized steel or Type 316L stainless steel.

2.6 ADHESIVES:

A. Adhesives shall not contain urea formaldehyde.

B. VOC Content for installation adhesives and glues: Comply with the following limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Wood Glues: Not more than 30 g/L.
2. Panel adhesive: Not more than 50 g/L.
3. Contact Adhesive: Not more than 250 g/L.
4. Special Purpose Contact Adhesive (contact adhesive that is used to bond melamine covered board, metal, unsupported vinyl, Teflon, ultra-high molecular weight polyethylene, rubber or wood veneer 1/16 inch or less in thickness to any surface): 250 g/L.

2.7 FABRICATION:

A. General:

1. Quality grade for architectural woodwork shall be AWI Custom Grade.
2. Fabricate architectural woodwork in accord with approved shop drawings.
3. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
4. Seal faces and edges of medium density fiberboard indicated to be sealed or finished.
5. Perform veneer operations using hot press method using moisture-resistant, fire-retardant adhesives.
6. Shop-assemble for delivery to site in units easily handled and to permit passage through building openings. Items which cannot be manufactured in one piece shall have joints at logical breaking points and shall be so noted on shop drawings.
7. Apply plastic laminate sheets in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners.
8. Cap exposed plastic laminate finish edges with material of same finish and pattern.
9. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
10. Scribe, miter and accurately join members.

11. Finish work shall be smooth, free from abrasion, tool marks, open joints or raised grain on exposed surfaces.
- B. Casework:
1. Fit shelves, doors and exposed edges with plastic laminate edging. Use one piece for full length only.
 2. Where countertops can not be provided in single length, join using compression type fasteners.
 3. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, fixtures and fittings. Verify locations of cutouts from onsite dimensions. Seal contact surfaces of cut edges.
- C. Standing and running trim:
1. Shop prepare and identify components for grain matching during site erection.
 2. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for searching and site cutting.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Prior to pre-installation conference, examine substrates and conditions to receive work. Check that floors and wall substrates are level, plumb and within tolerances to receive work specified in this section.
- B. Verify mechanical, electrical and building items affecting work of this section are placed and ready to receive architectural woodwork.
- C. Do not begin work until unsatisfactory substrates or conditions have been corrected.
- D. Pre-installation conference:
1. Prior to beginning work, a pre-installation conference will be held to review work to be accomplished.
 2. Contractor, fabricator/installer and Architect shall be present.
 3. Contractor's submittals will be reviewed.
 4. Substrates and conditions under which woodwork shall be installed will be reviewed.
 5. Contractor shall notify all parties at least seven days prior to time of conference.
 6. Contractor shall record minutes of meeting and distribute to all parties in attendance.

3.2 JOB MOCK-UP:

- A. Erect a full size mock-up of cabinet work at project site for Architect's acceptance. If unacceptable, erect additional mock-ups until acceptable.
- B. Mock-up shall indicate the following:
1. Workmanship.
 2. Finishes.

3. Relationships to adjacent work.
4. Do not begin woodwork production until each mock-up has been accepted by Architect.

C. Accepted, undamaged mock-up may remain as part of the finished work.

3.3 GENERAL WORKMANSHIP:

- A. Install woodwork in a manner consistent with the specified Quality Grade, plumb, level, true and straight within 1/8" in 10'-0". Shim as required using concealed shims.
- B. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing.
 1. Use fixture attachments in concealed locations for wall mounted components.
 2. Secure cabinet and counter base to floor using angles and anchorages.
- C. Scribe and cut for accurate fit to other finished work, with maximum gap of 1/32". Do not use addition overlay trim to conceal larger gaps.
- D. Use concealed joint fasteners to align and secure adjoining cabinet units and countertops.
- E. Before making cutouts, drill pilot holes at corners.
- F. Finish work shall be smooth, free from abrasion, tool marks, raised grain grade markings or similar defects on exposed surfaces.
- G. Distribute defects allowed in the quality grade specified to the best overall advantage when installing job assembled work. Install work in accord with approved shop drawings.
- H. Touch up mill finished items, including refinishing necessitated by job fitting or attaching and repair of scratches and similar damages. Touch up repairs shall be indiscernible in the finished work.

3.4 INSTALLATION OF STANDING AND RUNNING TRIM:

- A. Trim and moldings: Install in single unjointed lengths for openings and for runs less than 10'-0". For longer runs, use only one piece less than 10'-0" in straight runs. Join lengths with beveled butt joints. Stagger joints in adjacent members. Cope at returns and miter at corners.
- B. Attach and secure in place with uniform joints providing for thermal and building movements.
- C. Attachment: Blind anchor where possible. Use finishing nails or trim-head screws where exposed. Set exposed heads for filling. Secure work to framing, anchors or blocking which is built in or directly attached to structural elements.

3.5 FIELD FINISHING:

- A. Field finish: Field finish painted woodwork in accord with the requirements of the Painting and Coating section. Prior to finishing, sand using 120 to 180 grit abrasive on a smooth sanding block, to remove scuff and handling marks, raised grain, scratches and effects of moisture exposure.

3.6 CLEANING AND PROTECTION:

- A. Protect finished and prefinished surfaces from work of other trades.
- B. Prior to Date of Substantial Completion, examine work for damages. Repair or replace such damaged work to original condition.
- C. Clean wood, metal and accessory items using a neutral cleaner. Check and correct operating mechanism for proper operation. Adjust and lubricate hinges, catches and other operating hardware.

End of Section

SECTION 06 6116

SOLID SURFACING FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY:

- A. Work of this section includes:
 - 1. Lavatory tops with undermount bowls.
 - 2. Countertops.

1.2 REFERENCES:

- A. Applicable standards: Standards of the following, as referenced herein:
 - 1. American National Standards Institute (ANSI).
 - 2. ASTM International (ASTM).

1.3 SUBMITTALS:

- A. Shop drawings: Indicate dimensions, component sizes, fabrication details attachment provisions and coordination requirements with adjacent work.
- B. Samples: Submit minimum 6" by 6" samples. Indicate full range of color and pattern variation. Approved samples will be retained as a standard for work.
- C. Product data: Indicate product description, fabrication information and compliance with specified performance requirement.
- D. Maintenance data: Submit manufacturer's care and maintenance data, including repair and cleaning instructions. Include in project closeout documents.

1.4 DELIVERY, STORAGE AND HANDLING:

- A. Deliver no components to project site until areas are ready for installation. Store indoors.
- B. Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.5 WARRANTY:

- A. Provide manufacturer's warranty against defects in materials. Warranty shall provide for replacement material and labor for a period of ten years, beginning at Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOLID SURFACING MATERIAL:

A. Acceptable products:

1. Basis of design: E. I. du Pont de Nemours & Co., Inc., Corian.
2. Avonite, Inc., Formastone.
3. Wilsonart International, Gibraltar.

B. Material: Cast, 100% acrylic resin, solid, structural surfacing material.

1. Material shall be through-patterned and homogeneous. No coated materials nor non-homogeneous materials allowed.
2. Hardness: Minimum 55 Barcol hardness, tested in accord with ASTM D2583-07, or minimum 90 Rockwell hardness, tested in accord with ASTM D785-03.
3. Tensile strength: Minimum 4,200 psi, tested in accord with ASTM D638-03.
4. Abrasion resistance: Maximum 0.4 grams at 1,000 cycles, tested in accord with ASTM C501-84(2002).
5. Fire resistance: Flame spread and smoke developed meeting ASTM E84-07, Class I rating.
6. Color stability: No change in 200 hours, tested in accord with NEMA LD3-2005.
7. Water absorption: Maximum 0.06%, tested in accord with ASTM D570-98(2005).
8. Fungal resistance: No attack when tested in accord with ASTM G21-96(2002).
9. Bacterial resistance: No attack when tested in accord with ASTM G22-76(1996) (withdrawn 2001).
10. Impact resistance: No fracture when tested in accord with NEMA LD3-2005; Section 3.3, 144" drop.
11. Superficial damage to a depth of 0.10" shall be repairable by sanding and polishing.

2.2 CHARACTERISTICS:

A. Finish: Matte (Gloss rating of 5-20).

B. Thickness: Minimum 1/2".

C. Colors: Colors as indicated on drawings or as selected by Architect from basis of design manufacturer's Group C color range.

D. Countertops:

1. Provide configurations indicated. Provide full-length units for lengths shorter than 10'-0".
2. Provide backsplashes, endsplashes and aprons as indicated.

E. Lavatory tops with bowls:

1. Provide configurations indicated.
2. Provide backsplashes, endsplashes and aprons as indicated.
3. Bowls shall be undermount (underslung) porcelain bowls as indicated on drawings.

2.3 ACCESSORY PRODUCTS:

- A. Joint adhesive: Manufacturer's standard, two-part adhesive kit to create inconspicuous, non-porous joints, with a chemical bond.
- B. Sealant: Manufacturer's standard mildew-resistant, FDA/UL recognized silicone sealant in color matching surfacing or clear formulations.

2.4 FABRICATION:

- A. Factory-fabricate components to greatest extent practicable, to sizes and shapes indicated, in accord with approved shop drawings.
- B. Form joints between components using manufacturer's standard joint adhesive; without conspicuous joints and without voids. Attach a 2" wide reinforcing strip of solid surfacing under each joint.
- C. Provide factory cutouts for plumbing fittings and bath accessories as indicated.
- D. Rout and finish component edges to a smooth, uniform finish. Rout cutouts and sand edges smooth. Machine radii and contours to template. Repair or reject defective and inaccurate work.
- E. Edge treatment for tops: As indicated on drawings.

2.5 SOURCE QUALITY CONTROL:

- A. Allowable tolerances:
 - 1. Variation in component size: $\pm 1/8"$.
 - 2. Location of openings: $\pm 1/8"$ from indicated location.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install components plumb, level and rigid, scribed to adjacent finishes, in accord with approved shop drawings and product data.
- B. Form field joints using specified adhesive, with joints inconspicuous in finished work.
- C. Provide back and end splashes as indicated. Adhere to countertops using specified color-matched silicone adhesive.
- D. Keep components clean during installation. Remove adhesives, sealants and other stains. Keep clean until Date of Substantial Completion. Replace stained components.
- E. Make plumbing connections to sinks in accord with Division 22, Plumbing.

3.2 PROTECTION:

- A. Protect surfaces from damage until Date of Substantial Completion. Repair or replace damaged work which cannot be repaired.

End of Section

SECTION 07 1000

DAMPPROOFING

PART 1 - GENERAL

1.1 SUBMITTALS:

- A. Product data: Submit manufacturer's product specifications and installation instructions, including rates of application for each type installation specified.

1.2 QUALITY ASSURANCE:

- A. Applicable standards: Standards of ASTM International (ASTM), as referenced herein.

PART 2 - PRODUCTS

2.1 CAVITY WALL DAMPPROOFING:

- A. Acceptable products; subject to compliance with specified requirements:
 - 1. BASF Building Products, Hydrocide #700B Semi-Mastic.
 - 2. Karnak Corp., Karnak 220 Fibrated, asbestos-free.
 - 3. Lambert Corp., Waterban 60 SM.
 - 4. W. R. Meadows, Inc., Sealmastic Type Two.
- B. Characteristics: Non-asbestos, fibrated, mineral colloid asphalt emulsion meeting ASTM D1227-95(2007), Type 2, Class I and ASTM D1187-97(2002)e1, Type 1; brush- or spray-applied.
- C. Primer: Type recommended by dampproofing manufacturer for application to concrete unit masonry substrate.
- D. Reinforcing fabric for joints and abutting dissimilar substrates: Glass fiber mat reinforcement as recommended by dampproofing manufacturer.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION:

- A. Prior to application of materials, remove dirt, grease, mortar droppings and other foreign matter from substrate.
- B. Prime wall surfaces prior to dampproofing application, as required by manufacturer's product data.
- C. Apply dampproofing at temperatures above 40 degrees F., to dry, cured surfaces.

- D. Preparation at joints and abutting dissimilar substrates:
Apply one coat of dampproofing and fully embed a layer of specified glass fiber mat reinforcement into wet dampproofing. Reinforcement shall span joints and junctures and lap onto adjacent surfaces a minimum of 3" each side. Apply topcoat of dampproofing to all surfaces as further specified.

3.2 CAVITY WALL APPLICATION:

- A. Spray- or brush-apply dampproofing in a minimum of two coats, in accord with manufacturer's product data, at a rate to achieve a minimum 1/16" wet film coverage.
- B. Apply dampproofing to exterior face of interior masonry wythe in exterior double wythe walls.

3.3 CLEAN UP:

- A. Protect adjacent finished surfaces from damage or staining from this work by masking prior to application. Repair or replace surfaces damaged or stained by dampproofing work.
- B. At completion of dampproofing operations, remove debris resulting from work, including spilled materials.

End of Section

SECTION 07 1300

MEMBRANE WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY:

- A. Work of this section includes application of self-adhering sheet waterproofing to below-grade vertical surfaces.
- B. Related work specified elsewhere: Foundation drainage system.

1.2 SUBMITTALS:

- A. Product data: Include manufacturer's product literature and installation instructions, including instructions for sealing at joints, terminations and protrusions.
- B. Substrate certification: Submit certification from authorized representative of membrane system manufacturer, stating that substrate surfaces and conditions are acceptable for the purpose of providing specified warranty.

1.3 QUALITY ASSURANCE:

- A. Applicable standards: Standards of ASTM International (ASTM) as referenced herein.

1.4 PROJECT/SITE CONDITIONS:

- A. Apply membrane system in dry weather when temperature is 40 degrees F. or above. Undertake application only when forecasted weather conditions predict suitable conditions.
- B. Surfaces to receive membrane system shall be dry, cured, smooth, free of voids, honeycombs, loose aggregate projections, grease, oil and foreign material. Commence application only after surfaces are in proper condition to receive membrane system.
- C. Ascertain that work of other trades penetrating membrane system is in place and accepted prior to installation of membrane system. Schedule application to minimize traffic on membrane.

1.5 WARRANTY:

- A. Warrant waterproofing work from defects in materials and workmanship, including leakage, for a period of two years, beginning at Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SELF-ADHERING SHEET WATERPROOFING:

- A. Sheet waterproofing requiring protection board:
 - 1. Acceptable products; subject to compliance with specified requirements:
 - a. Carlisle Coatings & Waterproofing, Inc., CCW MiraDRI 860/861.
 - b. Grace Construction Products, Bituthene 3000.
 - c. W. R. Meadows, Inc., Mel-Rol.
 - 2. Characteristics: Manufacturer's standard polyethylene sheet coated one side with adhesive consistency rubberized asphalt; 60 mils thickness. Adhesive side coated with release type paper.
- B. Primers, liquid membrane, mastic and sealant: Membrane manufacturer's standard components. Primer shall comply with Volatile Organic Compound (VOC) regulations.
- C. Prefabricated drainage mat for vertical application:
 - 1. Acceptable products:
 - a. American Wick Drain Corp., Amerdrain 520.
 - b. Carlisle Coatings & Waterproofing, Inc., CCW MiraDRAIN 6000XL.
 - c. Grace Construction products, Hydroduct 220.
 - d. W. R. Meadows, Inc., Mel-Drain 5035-B.
 - e. Tremco, Inc., TREMDrain.
 - 2. Characteristics:
 - a. High density polyethylene core netting or molded polymer drain core with non-woven geotextile fabric adhered to one face and polymeric film on opposite face.
 - b. Composite system flow rate shall be minimum 15 gpm/ft. when tested in accord with ASTM D4716-04.
 - c. Core compressive strength shall be minimum 15,000 psf when tested in accord with ASTM D1621-04a.
 - 3. Prefabricated drainage mat adhesive: Manufacturer's standard adhesive strips.

PART 3 - EXECUTION

3.1 SHEET MEMBRANE SYSTEM INSTALLATION:

- A. Install sheet membrane system fully adhered to substrates in accord with manufacturer's product data, except where more stringent requirements are specified herein.
- B. Prime surfaces to receive membrane and flashing materials. Allow primer to dry until tack-free. Prime only area which can be covered with sheet membrane during work period.
- C. Reprime surfaces which are not covered within 24 hours of primer application.
- D. Install membrane and flashing materials with side and end laps recommended by product data. Begin installation at low points, lapping succeeding sheets to shed water.

- E. Membrane applications shall be fully adhered, smooth, straight and free of blisters, buckles, fishmouths and wrinkles affecting the complete adherence of the membrane. Patch and repair defective work in accord with manufacturer's product data. Areas which exhibit defective areas or generally poor or improper workmanship shall be removed and replaced, as directed by Architect.
- F. Flashing: Install in accord with manufacturer's recommended details. Lap joints in accord with manufacturer's product data. Attach flashing at top edge with fasteners spaced at 8" o. c.
- G. At below-grade walls, extend membrane down foundation face 4", minimum, below lowest floor slab, or where foundation walls extend substantially below lowest floor level, extend membrane minimum of 1'-0" below lowest floor slab. Carry membrane to within 1" of finish grade.
- H. Trowel-apply mastic at exposed sheet edges.
- I. Apply liquid membrane at intersection of horizontal waterproofing with vertical surfaces. Apply in 1/4" wet thickness, extending 1" onto membrane and minimum 1-1/2" up face of vertical surface.
- J. Lap membrane at joints 2-1/2", minimum.
- K. Form 1" by 1" liquid membrane fillets at internal corners and at intersection of horizontal and vertical surfaces.
- L. Double membrane at corners by application of a membrane strip centered along corner. Cover strip completely with full width sheet.
- M. Apply a double layer of waterproofing membrane at protrusions, extending minimum of 6" in each direction. Seal around protrusion with liquid membrane material. Seal membrane terminations with mastic.
- N. Repair punctures and tears in membrane by patching with membrane material prior to drainage mat installation. Trowel-apply mastic at exposed edges of patch.
- O. Install prefabricated drainage mat after membrane installation. Secure to vertical surfaces with adhesive strips at rate required by product data. Secure in place until backfilling is completed.
 - 1. Overlap drainage panels 2", minimum. Peel filter fabric back and nest panels, replacing filter fabric over lap.
 - 2. At terminations, tuck filter fabric behind panel core.
 - 3. Terminate drainage panels within 6" of finished grade.
 - 4. At foundation drains, place drainage panel adjacent to drain. Wrap filter fabric around drain.
- P. Completed installation shall be free of leaks and ponded water.

End of Section

SECTION 07 1900

WATER-REPELLENT COATING

PART 1 - GENERAL

1.1 SUMMARY:

- A. Work of this section includes clear water-repellent for precast architectural concrete.
- B. Related work:
 - 1. Joint sealants.
 - 2. Precast architectural concrete.
 - 3. Architectural concrete unit masonry.

1.2 SUBMITTALS:

- A. Product data:
 - 1. Indicate instructions for preparation of surfaces to receive water-repellent, acceptable moisture content of substrates, rate of application, product data and detailed installation methods.
 - 2. Indicate compliance with VOC rating and applicable VOC regulations.
- B. Certification: Submit written verification from manufacturer that installer is certified for application of specified water-repellent. Include original certification dates, recertification dates and names of individuals trained from installer's personnel.
- C. Letter of compliance: Submit a letter, signed by selected product manufacturer or manufacturer's designated agent, stating that quantities of materials furnished and rates of application of such materials, as well as application methods, comply with manufacturer's product data. Submit letter of compliance immediately following completion of water-repellent application.
- D. Cleaning instructions for adjacent materials: Obtain written instructions from manufacturers of adjacent materials, including such items as metal glazing assemblies and glass, for removal of water-repellent from such surfaces. Submit prior to pre-application conference.

1.3 QUALITY ASSURANCE:

- A. Manufacturer: Manufacturer shall have been engaged in successful manufacture of water-repellent systems for a minimum of five years.
- B. Installer:
 - 1. Certified by manufacturer to apply specified products.
 - 2. Completed a minimum of five projects of comparable scope and complexity using specified systems within last three years.

- C. Application equipment: Type recommended by water-repellent manufacturer or approved by him for use on this project. Equipment shall be in good operating condition.
- D. Sample panel: At least seven days prior to pre-application conference, apply a sample of water-repellent to precast architectural concrete and architectural concrete unit masonry sample panel in an area of 100 sq. ft. of surfaces indicated to receive water-repellent.
 - 1. Notify Architect for review of sample panel. If sample is unacceptable, re-apply until acceptable to Architect. Approved sample will become standard for water-repellent work.
 - 2. Apply water-repellent to sample panel in quantities and number of applications required for water-repellent work.
- E. Pre-application conference:
 - 1. Prior to beginning water-repellent work, hold a pre-application conference to review work to be accomplished.
 - 2. Contractor, water-repellent applicator, masonry subcontractor, precast architectural concrete subcontractor, caulking subcontractor, Architect, representative of water-repellent manufacturer and other trades with work related to water-repellent installation shall be present.
 - 3. Contractor shall notify all parties at least seven days prior to time of conference.
 - 4. Contractor shall record minutes of meeting and distribute to all parties in attendance.

1.4 DELIVERY, STORAGE AND HANDLING:

- A. Deliver materials in manufacturer's original containers with labels intact.
- B. Store materials out of the weather, in a single location. Protect from freezing.

1.5 PROJECT/SITE CONDITIONS:

- A. Weather: Apply water-repellent only when weather conditions are within requirements of water-repellent product data.
- B. Protection of adjacent surfaces: Mask, cover or otherwise protect finished adjacent surfaces from damage caused by work specified in this section.
- C. Protect finished water-repellent from staining, marring and damages from work of other trades.

1.6 WARRANTY:

- A. Provide water-repellent manufacturer's standard ten year warranty.

- B. Special warranty:
1. Manufacturer shall warrant installed system for a period of 10 years against the following conditions. When notified in writing from Owner, manufacturer shall, without inconvenience or cost to Owner, correct cited deficiencies.
 2. Loss of water repellency shall be determined by RILEM Uptake Tube:
 - a. Precast architectural concrete: 0.5 mil/20 minutes or greater (80 mph wind driven rain equivalent).
 - b. Architectural concrete unit masonry: 1.0 mil/20 minutes or greater (60 mph wind driven rain equivalent).
- C. Warranties shall begin at Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PENETRATING WATER-REPELLENT:

- A. Acceptable products:
1. Chemprobe Coating Systems, L.P., Dur A Pell 20.
 2. BASF Building Systems, Enviroseal 20.
 3. Pecora Corp., Klere-Seal 920-W.B.
- B. Characteristics: VOC compliant, clear, water based penetrating silane or silane/siloxane blend, minimum 20% solids; spray applied.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Moisture content of surfaces to receive water-repellent shall be within limits recommended by water-repellent manufacturer's product data. Test substrates with a moisture meter prior to beginning or continuing work. Proceed only when moisture of substrate meets the requirements of manufacturer's product data.
- B. Apply water-repellent after cleaning masonry as specified in Concrete Unit Masonry section.
- C. Apply water-repellent to concrete surfaces after cleaning, as specified in Precast Architectural Concrete section.
- D. Remove loose particles, dirt, grease, oil and other foreign materials from surfaces.
- E. Mask adjacent surfaces not to be coated. Remove masking materials immediately following application.
- F. Coordinate water-repellent application with caulking work. Apply water-repellent only after caulking has been performed in accord with requirements of Joint Sealants section.

3.2 WATER-REPELLENT APPLICATION:

- A. Apply water-repellent to designated surfaces in accord with manufacturer's product data requirements for coverage and installation procedures. Apply water-repellent in number of applications in accord with manufacturer's product data.
- B. Apply water-repellent using low pressure spray. Apply water-repellent with run-down of water-repellent material in accord with manufacturer's product data.
- C. Immediately following water-repellent application, clean overspray from adjacent surfaces. Comply with water-repellent manufacturers product data for cleaning of adjacent materials.

End of Section

SECTION 07 2100
THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY:

- A. Related work:
 - 1. Firestopping.
 - 2. Acoustical insulation.
 - 3. Mechanical insulation.
 - 4. Concrete.
 - 5. Exterior insulation and finish system (EIFS).

1.2 SUBMITTALS:

- A. Product data: Submit product data and installation instructions for each type installation.

1.3 QUALITY ASSURANCE:

- A. Applicable standards: ASTM International (ASTM), standards as specified herein.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE INSULATION:

- A. Acceptable products; subject to compliance with specified requirements:
 - 1. The Dow Chemical Co., Styrofoam, Square Edge.
 - 2. Owens-Corning, Foamular 250, Square Edge.
 - 3. Pactiv Building Products, GreenGuard CM Insulation Board.
- B. Characteristics:
 - 1. Material: Extruded, closed cell polystyrene boards complying with ASTM C578-06, Type IV.
 - 2. Thickness: 1-1/2".
 - 3. Density: 1.6 pcf, minimum.
 - 4. Aged R value at 75 degrees F.: 5.0/in.
 - 5. Surface burning characteristics: Flame spread of 75 or less and smoke developed 450 or less when tested in accord with ASTM E84-07.
 - 6. Compressive strength: 25 minimum, tested in accord with ASTM D1621-04a.
 - 7. Water vapor permeance: Maximum 1.1 perm-inch, tested in accord with ASTM E96-05.
 - 8. Water absorption: Maximum 0.3% by volume.
 - 9. Sizes: 2'-0" by 8'-0".
 - 10. Edges: Square.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. General: Comply with manufacturer's product data for each type installation. Install insulation fitted to adjacent construction and with tight joints to provide unbroken thermal barrier. Cut insulation around obstructions and protrusions; fill voids with insulation. Remove projections interfering with installation.
 - 1. Rigid wall insulation indicated to be covered with gypsum board shall be extruded polystyrene insulation.

- B. Extruded polystyrene insulation:
 - 1. Secure extruded polystyrene insulation to masonry using adhesive of type recommended by insulation manufacturer. Install with end and edge joints butted over clean, dry surfaces, using full application of adhesive applied in uniform thickness.
 - 2. Install extruded polystyrene insulation between Z-furring members where indicated. Friction fit between studs and secure using adhesive of type recommended by manufacturer's product data.

End of Section

SECTION 07 2400

EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

PART 1 - GENERAL

1.1 SUMMARY:

- A. Work of this section includes a polymer-based EIFS system consisting of:
 - 1. Application of rigid insulation board.
 - 2. Regular and heavy duty glass fiber mesh reinforcement.
 - 3. Base and finish coat application.
- B. Related work specified elsewhere:
 - 1. Cold formed metal framing.
 - 2. Flashing and sheet metal.
 - 3. Joint sealants.
 - 4. Concrete unit masonry.

1.2 SUBMITTALS:

- A. Shop drawings: Indicate details for reveals, joints, edges, corners and other special conditions, including joint design and sealant locations.
- B. Product data: Submit manufacturer's full descriptive literature and installation instructions, marked as applicable to project conditions and requirements. Include standard details and list of all accessory products. Provide comprehensive data on insulation board, including manufacturer if not by system manufacturer, and fire test data on system.
- C. Intent to warrant: Submit an intent to warrant executed by authorized representative of EIFS manufacturer, indicating that manufacturer has reviewed drawings, specifications, shop drawings, conditions affecting the work and the relationship of EIFS and adjacent construction and proposes to provide warranties as referenced herein without further stipulation.
- D. Certificates: Manufacturer shall submit certification that insulation provided for work of this section meets requirements as herein specified.
- E. Samples: Submit minimum 1'-6" by 1'-6" sample, including sheathing material, showing selected color and texture for final approval of finish by Architect.
- F. Certifications by system manufacturer; submit the following prior to delivery of materials to project site:
 - 1. System applicator approval.
 - 2. Approval of sealant system.
 - 3. Expanded polystyrene insulation properties, date of manufacture, curing method and quantities shipped to job.
 - 4. Certification of installed gypsum sheathing as acceptable insulated finish system substrate.

- G. Maintenance data: Submit data on manufacturer's recommendations for cleaning and repairing damage to system.

1.3 QUALITY ASSURANCE:

- A. Manufacturer qualifications: Manufacturer shall have been regularly engaged in production of systems herein specified for a minimum of five years for projects of similar size and complexity. Manufacturer shall only sell and distribute system components to approved applicators.
- B. Applicator qualifications: Applicator shall be approved by system manufacturer and shall have a minimum of five years experience in the installation of projects with similar scope and application procedures.
- C. EIFS components shall be the products of a single manufacturer; or if not, specifically approved by manufacturer in writing.
- D. Applicable standards:
1. Standards of ASTM International (ASTM), as referenced herein.
 2. Exterior Insulation Manufacturer's Association (EIMA), Standard 101.86 Impact Test and other standards as referenced herein.

1.4 DELIVERY, STORAGE AND HANDLING:

- A. Deliver materials in manufacturer's original packaging with labels intact.
- B. Store materials indoors, in temperature range of 40 degrees F. to 80 degrees F. Store off floor and out of direct sunlight.

1.5 PROJECT/SITE CONDITIONS:

- A. Environmental:
1. Erect and cure finish system only when temperature is at least 40 degrees F. and rising. Maintain above 40 degrees F. for 24 hours after installation.
 2. Install finish system when finish will not be subject to damaging effects of rain or windblown dust and debris before system finish has cured.
- B. Protection:
1. Apply mesh and base coat to insulation within two days following board installation.
 2. Protect fresh finish from rain, mud, dust and other physical harm or contamination.
 3. Protect exposed edges of system from water penetration behind insulation board or finish coat.
 4. Install flashing and seal joints as soon as possible following system installation and curing.
- C. Coordinate installation of EIFS with sheathing installation to minimize exposure of sheathing to weather.

- D. Control and expansion joints: Unless otherwise indicated, provide control or expansion joints only at abutment with adjacent dissimilar materials, where structural expansion joints occur in building system and as recommended by finish system manufacturer.

1.6 WARRANTY:

- A. Manufacturer shall provide a material and watertightness warranty for exterior insulated finish system against defects in materials and against bond loss, peeling, flaking, chipping, fading, discoloration and loss of water resistance. Warranty shall cover all replacement costs, including materials and labor, due to failure of the system without additional cost to Owner.
- B. Warranty period shall be for five years beginning at Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 INSULATED FINISH SYSTEM:

- A. Acceptable manufacturers; subject to compliance with specified requirements:
1. Basis of design: Dryvit System, Inc.
 - a. Adhesives: ADEPS for wood substrates; Primus or Primus DM for other substrates.
 - b. Insulation board.
 - c. Reinforcing mesh:
 - 1) Regular duty mesh: Standard Plus Mesh, 5.7 oz./sq.yd.
 - 2) Medium duty mesh: Intermediate, 12 oz./sq.yd.
 - 3) Heavy duty mesh: Panzer Mesh, minimum 15 oz./sq.yd.
 - 4) Detail mesh: Detail Short Roll Mesh, 4.3 oz./sq.yd.
 - 5) Corner mesh: Corner Mesh, 7.2 oz./sq.yd.
 - d. Basecoat: Primus or Primus DM.
 - e. Finish coat: Elastomeric DPR (Dirt Pickup Resistant).
 - f. Coating for areas to receive sealant joints: Demandit or Color Prime.
 2. Finestone Brand/BASF Wall Systems.
 3. Parex, Inc.
 4. Senergy Brand/BASF Wall Systems.
 5. STO Finish Systems Div./Sto Corp.
- B. General system description: Expanded polystyrene insulation adhesively applied to concrete unit masonry, reinforced with regular and heavy duty mesh fabric over base coat in areas as specified, and finished with textured finish coat.

- C. Coating components:
1. Primer/sealer: EIFS manufacturer's standard substrate conditioner with VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), designed to seal substrates from moisture penetration and to improve the bond between substrate of type indicated and adhesive used for application of insulation.
 2. Adhesive and base coat: Polymer base cementitious, pre-mixed material for non-wood substrates; polymer base non-cementitious, pre-mixed material for wood substrates. Adhesives shall be manufactured by system manufacturer.
 - a. Provide adhesives recommended by system manufacturer for attachment of insulation to concrete unit masonry.
 - b. Bond strength: Adhesives shall have been tested to withstand 180 psf negative pressure without loss of bond to substrate in accord with ASTM E330-02.
 - c. Insulation Adhesive: EIFS manufacturer's standard formulation designed for indicated use; compatible with substrate; with VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24); and complying with one of the following:
 - 1) Job-mixed formulation of Portland cement complying with ASTM C 150, Type I, and polymer-based adhesive specified for base coat.
 - 2) Factory-blended dry formulation of Portland cement, dry polymer admixture, and fillers specified for base coat.
 - 3) Factory-mixed non-cementitious formulation designed for adhesive attachment of insulation to substrates of type indicated, as recommended by EIFS manufacturer.
 2. Mesh reinforcement: Alkali-resistant glass or synthetic fabric provided by system manufacturer; provide regular, detail, corner and heavy duty mesh.
 3. Finish coat: Manufacturer's factory-blended, integral-colored synthetic elastomeric finish, dirt pickup resistant.
 - a. Color: Match color of brick mortar (Holnam, Inc., 10-912).
 - b. Texture: Smooth
- D. Insulation: Provide straight and special shapes as indicated and required.
1. Type: Expanded polystyrene meeting ASTM C578-06, Type 1, manufactured or approved by system manufacturer and aged at least six weeks prior to time of cutting.
 2. Minimum density: 0.9 pcf, minimum.
 3. Thermal value: Aged R value of 3.25/inch or better at 75 degrees F.
 4. Burning characteristics: Flame spread of 25 or less when tested in accord with ASTM E84-07.
 5. Dimensional tolerances:
 - a. Edges: Square within 1/32" per foot.
 - b. Board thickness: $\pm 1/16$ ".

6. Compressive strength, 10% deformation: 10 psi, minimum.
 7. Moisture resistance:
 - a. Water vapor permeance: Maximum 5.0 perms/in.
 - b. Absorption: 4% maximum.
 8. Thickness: Minimum 1", with greater thicknesses as indicated on the drawings.
- E. Trim shapes: Minimum 26 ga. roll-formed zinc alloy with expanded or solid flanges.
- F. Accessories: Provide sizes and shapes as indicated on the drawings.
- G. Sealant: Dow Corning Corp., #790 low modulus silicone sealant as specified in Joint Sealants section.

PART 3 - EXECUTION

3.1 PRE-INSTALLATION CONFERENCE:

- A. Prior to installation, conduct a pre-installation job site conference with Contractor, Architect, exterior insulation and finish system installer, manufacturer's technical representative and other subcontractors involved to review Contract Document requirements, project procedures, acceptability of substrates, job conditions, time schedule, manufacturer's recommendations and coordination of other work.
1. Contractor shall notify all parties at least seven days prior to time for conference.
 2. Contractor shall record minutes of meeting and distribute copies to all participants.

3.2 JOB MOCK-UP:

- A. Construct minimum 100 sq. ft. mock-up of insulating finish system over sheathing, indicating color, texture and workmanship of finished work. Erect sample panel in area designated by Architect. Mock-up shall indicate typical reveals, corner and other conditions as directed by Architect. Do not proceed with work until panel has been approved by Architect. Approved, undamaged mock-up may serve as part of finished work. Approved mock-up shall serve as a standard for subsequent work.

3.3 INSULATION INSTALLATION:

- A. Cleaning: Ensure that surfaces to receive insulation are clean and sound.
- B. Placement: Install horizontally with vertical joints staggered. Cut to fit openings and projections without voids. Butt joints tight and even, but do not force or wedge boards. Where gaps occur in joints, fill with insulation slivers to fill voids.

- C. Attachment: Provide full adhesive coverage using methods recommended by system manufacturer's product data. Apply sufficient adhesive thickness to ensure full contact between surfaces of insulation and substrate. Brace until adhesive sets to provide a tightly bonded, smooth surface.
- D. Profiles: Cut and place insulation to form indicated profiles. Provide for panel reveals, recesses, joints, drips and other profiles indicated on the drawings. Shave edges by rasping to provide smooth plane across board joints.

3.4 MESH AND FINISH APPLICATION:

- A. Base coat and mesh reinforcement:
 - 1. Apply trowel coating of base coat material to uniform minimum dry thickness of 1/16".
 - 2. Immediately embed reinforcement without wrinkles, troweling for full embedment. Apply reinforcement continuous, overlapping edges 2-1/2" minimum.
 - a. Wrap all corners and edges, overlapping edges 2-1/2" minimum.
 - b. Wrap reinforcing mesh a minimum of 2" behind panels at all ends and edges, in accord with manufacturer's details and product data.
 - c. Form corners with sharp, tight, smooth edge, within specified tolerances.
 - 3. Where heavy duty mesh is required, apply heavy duty mesh as base layer of reinforcement. Butt joints of heavy duty mesh without overlap and stop at corners and edges without folding mesh. Apply second coating of base coat over reinforced base coat to a thickness of approximately 1/8", and immediately embed standard duty mesh as specified in fresh base coat.
 - 4. Provide heavy duty mesh in all areas indicated on drawings, including, but not limited to:
 - a. To 8'-0" above finish grade.
 - b. Areas adjacent to walkways.
- B. Finish coat: Apply to cured, reinforced base coat to give uniform texture and color, completely concealing mesh and reinforcement coat and matching approved sample in color and texture.
 - 1. For edges and terminations to receive sealant joints, do not install finish coat at substrates to receive sealant. Stop finish coat at joint juncture and use manufacturer's recommended sealing color coat, to provide a smooth, uniform substrate for sealant application.
 - 2. On an expanse, terminate work only at corners, expansion joints or distinct changes in plane. Maintain a wet edge on same-plane applications without cold joints and staging marks.
 - 3. At overlapping of mesh reinforcement, feather out finish coat to ensure that overlap joints are indiscernible in finished work.
 - 4. Apply color finish coat with same direction and texture throughout entire application.
 - 5. Begin only as much work on an expanse as can be completed the same work period.

C. General:

1. Provide straight, sharp, true corners, edges, joints, reveals, grooves and other profiles indicated. Provide corner reinforcement in accord with system manufacturer's product data.
2. Finish all areas to receive sealant joint by applying base coat, embedded mesh and finish coat into joints and around terminations, in accord with EIFS manufacturer's details.
3. Finish exposed edges where visible and to protect insulation from moisture.
4. Comply with system manufacturer's product data in all facets of the work.
5. Finish work shall be free of projections, voids, irregularities or telegraphing of substrate.

D. Joints: Seal joints in accord with the requirements of the Joint Sealants section.

E. Finish surface tolerances:

1. In linear building lines, elevations and conspicuous lines and arrises: Maximum 3/16" in 20'-0"; maximum 3/8" in 40'-0" or more.
2. In surface plane, plumb and level: 1/8" in 10'-0" in any direction when measured with a 10'-0" straightedge.
3. Substrate joints and surface imperfections shall not be visible when surfaces are viewed from 5'-0" or greater distances at typical viewing angles with surface wet or dry.

3.5 CLEANING AND PROTECTION:

A. Cleaning:

1. Remove masking materials from adjacent surfaces.
2. Clean excess materials and droppings from application from adjacent areas.

B. Protection: Provide polyethylene sheeting or other means of protecting finish from mud and dust. Protect completed work from damage, staining, dirt and debris. Maintain protection until Date of Substantial Completion.

C. Cover tops and edges indicated using materials specified in Flashing and Sheet Metal section. Seal joints with silicone sealant specified in Joint Sealants section.

End of Section

SECTION 07 2616

VAPOR RETARDER

PART 1 - GENERAL

1.1 SUMMARY:

- A. Work of this section includes below slab vapor retarder.

1.2 SUBMITTALS:

- A. Product data: Submit manufacturer's product literature and instructions for vapor retarder material and mastic.
- B. Samples: Submit 1'-0" by 1'-0" samples of vapor retarder.

1.3 DELIVERY, STORAGE AND HANDLING:

- A. Deliver materials to project site in manufacturer's original packaging or containers.
- B. Store to prevent damage, deterioration or contamination.

PART 2 - PRODUCTS

2.1 CLASS B VAPOR RETARDER:

- A. Acceptable products:
1. Fortifiber Corporation, Moistop Ultra "B".
 2. Raven Industries, Vapor Block 10.
 3. Reef Industries, Inc., Griffolyn Type-85.
 4. Stego Industries, LLC, Stego Wrap 10 mil.
 5. W.R. Meadows, Inc., PERMINATOR Underslab Vapor Mat 10.
- B. Type: Type: Either polyolefin sheet manufactured from ISO certified virgin resins, polyethylene sheet or 5-ply laminate, combining 3 layers of high-density polyethylene and 2 high-strength non-woven cord grids complying with requirements of ASTM E1745-97(2004), Class B.
- C. Characteristics:
1. Tensile strength when tested in accord with ASTM E154-99(2005): Minimum 30 lbf/in.
 2. Puncture resistance when tested in accord with ASTM D1709-04, Method B: Minimum 1700 g.
 3. Water vapor permeance when tested in accord with ASTM E154-99(2005), Section F or ASTM F1249-06: Maximum 0.3 perms.
 4. Thickness: Not less than 10 mils in accord with ACI 302.1R.

2.2 ACCESSORIES:

- A. Adhesive or tape: Meeting same performance requirements as vapor retarder and acceptable to manufacturer of vapor retarder material.

- B. Vapor proofing mastic: Polymer-modified bituminous/asphalt emulsion complying with requirements of ASTM C836-06.
- C. Pipe boots: Prefabricated from same material as membrane in accord with membrane manufacturer's product data.

PART 3 - EXECUTION

3.1 INSTALLATION UNDER CONCRETE SLAB-ON-GRADE:

- A. Install vapor retarder in accord with ASTM E1643-98 (2005) and in accord with manufacturer's product data, over compacted, clean subgrade material, free of debris and protrusions.
- B. Lay vapor retarder over interior building area to receive concrete slab. Apply membrane in full sheet widths. Lay membrane with seams parallel to and lapped in direction of concrete pour.
- C. Lap vapor retarder over footings or seal to foundation wall, or both, and seal around penetrations such as utilities and columns in order to create a monolithic membrane between the surface of the slab and moisture sources below the slab and at slab perimeter.
- D. Lap joints minimum 6" and seal with adhesive or pressure sensitive tape or both over entire lap.
- E. Seal to penetrations and protrusions by turning membrane up a minimum of 6" and sealing membrane edges to penetrations and protrusions with adhesive and tape, mastic or use manufacturer's prefabricated boot in accord with membrane manufacturer's product data. Fold at corners to form envelope.
- F. Where expansion or control joints are indicated in slab, lay vapor retarder continuous under joint filler.

3.2 PROTECTION:

- A. Protect vapor retarder installation from damage until concrete slab is in place.
- B. Prior to placement of concrete, repair damaged vapor retarder with vapor retarder material or in accord with manufacturer's product data.
- C. Lap beyond damaged areas a minimum of 6" and seal as prescribed for sheet joints.

End of Section

SECTION 07 2800
ELASTOMERIC COATING

PART 1 - GENERAL

1.1 SUMMARY:

- A. Work of this section includes waterproof elastomeric coating for concrete unit masonry on exterior of Building "A".
- B. Related work specified elsewhere:
 - 1. Flashing and sheet metal.
 - 2. Joint sealants.
 - 3. Concrete unit masonry.

1.2 SUBMITTALS:

- A. Product data: Submit manufacturer's instructions for installation of elastomeric material over substrates indicated. Include detailed requirements for preparation of surfaces, application rates and methods, treatment of joints and protection requirements. Delete inapplicable requirements from product data.
- B. Color samples: Submit two sets of color and texture samples from coating manufacturer for selections by Architect.

1.3 QUALITY ASSURANCE:

- A. Applicable standards: Standards of ASTM International (ASTM) as referenced herein.

1.4 DELIVERY, STORAGE AND HANDLING:

- A. Delivery:
 - 1. Deliver materials to project site ready-mixed in original containers with labels intact.
 - 2. Provide labels bearing manufacturer's name, coating type, color and recommended installation procedures.
- B. Storage and handling:
 - 1. Store materials in location acceptable to Architect.
 - 2. Maintain neat, clean conditions in storage area; remove rags and waste materials at end of each day's work.
 - 3. Close containers not in use. Leave no materials open.

1.5 PROJECT/SITE CONDITIONS:

- A. Environmental requirements:
 - 1. Comply with manufacturer's recommendations for environmental conditions under which materials may be applied and cured.
 - 2. Apply no materials when subject to windblown dust or rain.
 - 3. Apply no materials on wet surfaces or where temperature of substrate would result in excessive, rapid drying causing streaks or discoloration.

- B. Apply coating to substrate which indicates acceptable moisture level when tested by a moisture meter.
- C. Perform pH testing to determine alkalinity of substrates prior to coating application; comply with manufacturer's product data.

1.6 WARRANTY:

- A. Provide a five-year watertightness warranty, executed jointly by material manufacturer and applicator.
 - 1. Warranty shall provide for repair or replacement of defective materials or workmanship during the warranty period.
 - 2. Warranty shall include repair of minor hairline cracking of substrate resulting from thermal movement and nominal building shrinkage and settlement up to a maximum crack width of 1/64".
 - 3. Warranty shall begin at Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ACRYLIC ELASTOMERIC COATING:

- A. Acceptable products; subject to compliance with specified criteria:
 - 1. Devoe, Hydro-Shur HydroFlex (smooth finish).
 - 2. Lighthouse/VIP Products, Last-O-Coat 8000 Series.
 - 3. Porter Paints, Porter Flex 6000 Series Elastomeric Coating.
 - 4. BASF Building Systems, Colorflex.
- B. Characteristics:
 - 1. Composition: Water-borne, single-component, acrylic polymer, waterproofing-decorative coating system.
 - 2. Primers, fillers and sealers: As recommended by system manufacturer. Include block filler over unit masonry surfaces.
 - 3. Elongation for smooth texture elastomeric coatings: 330% minimum at break when tested in accord with ASTM D2370-98(2002).
 - 4. Moisture vapor permeability: Minimum 2.0 perms, maximum 12 perms, when tested in accord with ASTM D1653-03.
 - 5. Texture: Fine textured.
 - 6. Color: Standard color as selected by Architect.

PART 3 - EXECUTION

3.1 JOB MOCK-UP:

- A. Prepare a minimum 100 sq. ft. mock-up of elastomeric coating system in area as indicated on drawings, as directed by Architect, for Architect's review.

- B. Mock-up will be reviewed for color, texture, uniformity, appearance and workmanship. If mock-up is not satisfactory, prepare additional mock-ups until Architect's approval is obtained.
- C. Approved, undamaged mock-up may remain as part of the finished work and shall serve as a standard of quality for the remainder of the work.

3.2 PREPARATION OF SURFACES:

- A. Surfaces to receive coating shall be dry and free of oils, dirt, dust, grease, mildew, fungus, frost, efflorescence, laitance, peeling coating, chalking coating and other loose, foreign or deleterious materials.
 - 1. Verify that cracks and damage to substrate surfaces have been repaired and sealed prior to coating application.
 - 2. Verify that sealant work around wall penetrations and joints has been completed prior to coating application.
- B. Concrete unit masonry: Rub to remove loose mortar and debris. Fill irregularities with cement grout.
- C. Metals: Clean and prime in accord with product data.
- D. Prior to application of elastomeric coating system, expansion and control joints shall be caulked as specified in Joint Sealants section and metal flashings shall be installed and caulked.
- E. Mask all penetrations and adjacent surfaces to prevent coating adhesion to these surfaces.
- F. Mask caulked joints to prevent application of coating to sealant, including caulked joints of reglet counterflashing system. Do not allow masking to cover substrate beyond edge of sealant.

3.3 APPLICATION:

- A. Prime surfaces and apply block filler as directed by manufacturer's product data. Allow primer to dry before applying coating.
- B. Treat minor hairline cracks using manufacturer's buttering grade sealant material applied in 1/16" thickness over cracks and troweled flush with substrate or feathered at a distance of 2" either side of crack.
- C. Apply elastomeric coating in manner and number of applications to achieve minimum dry thickness of 12 mils, pinhole-free.
- D. Apply coating materials in accord with manufacturer's product data.
 - 1. Apply coating only when moisture content of surfaces is within manufacturer's recommended limits.

2. Apply materials using clean brushes, rollers or spraying equipment.
 3. Apply elastomeric coating in a fan pattern to achieve uniform thickness. Finish each stroke in same direction so that texture is uniform throughout expanse of installation.
 4. Comply with manufacturer's product data for drying time between coats.
- E. Finish coats shall be pinhole-free, smooth, free of brush marks, streaks, laps or pile-up of paint, skipped or missed areas.
- F. Make edges of coating adjoining other materials clean and sharp without overlapping.
- G. Remove masking before coating sets, leaving smooth edges and no uncoated substrate.

3.4 CLEANING:

- A. Leave finished work area in a neat condition with no evidence of overspray on adjacent surfaces or property. Clean-up spills and overspray immediately with soap and water.

End of Section

SECTION 07 4113
METAL ROOF PANELS

PART 1 - GENERAL

1.1 SUMMARY:

- A. Work of this section includes preformed metal:
 - 1. Architectural roofing system complete with perimeter and penetration flashing and closures and gutters and downspouts.
 - 2. Soffit system.
- B. Related work specified elsewhere:
 - 1. Structural insulated panels.
 - 2. Metal fabrications.
 - 3. Rough carpentry.
 - 4. Flashing and sheet metal.

1.2 DESIGN AND PERFORMANCE CRITERIA:

- A. Thermal movement: Completed metal roofing and flashing system shall be capable of withstanding expansion and contraction of components caused by a temperature range from -10°F. to +150°F. without buckling, producing excess stress on structure, anchors or fasteners, or reducing performance.
- B. Uniform wind load capacity: Installed roof system shall withstand positive and negative design wind loading pressures complying with International Building Code, with a maximum system deflection of L/120 and a maximum panel deflection of 0.04%.
- C. Roof system shall meet requirements of Class 1-75 when tested in accord with FM Standard 4471.
- D. Structural wind uplift resistance: Roof assembly shall withstand positive and negative air pressure testing in accord with ASTM E1592-05 using uniform static air pressure testing methods.
- E. UL wind uplift resistance classification: Roof assembly when tested in accord with UL 580 shall be classified as Class 90.
- F. Static pressure air infiltration: Completed roof system shall have maximum of 0.08 cfm/sq. ft. with 6.24 psf air pressure differential in accord with ASTM E1680-95(2003).
- G. Water penetration (static pressure): No evidence of uncontrolled leakage at 6.24 psf pressure differential in accord with ASTM E1646-95(2003).
- H. Capacities for gauge, span or loading other than those tested may be determined by interpolation of test results within the range of test data. Extrapolation for conditions outside test range are not acceptable.

1.3 SUBMITTALS:

- A. Shop drawings: Shall be prepared by or approved by manufacturer.
 - 1. Indicate roof system with flashings and accessories in plan and elevation; sections and details at full scale.
 - 2. Indicate metal thicknesses and finishes, panel lengths, joining details, anchorage details, flashings and special fabrication provisions for termination and penetrations, girt locations, expansion provisions and supports.
 - 3. Indicate relationships with adjacent and interfacing work.
 - 4. Indicate location of penetrations with relation to rib placement.

- B. Product data: Include manufacturer's detailed material and system description, installation instructions, engineering performance data and finish specifications.

- C. Intent to warrant: Submit an intent to warrant, executed by authorized representative of metal roof manufacturer, indicating that manufacturer has reviewed drawings, specifications and conditions affecting the work, and proposes to provide warranties as referenced herein without further stipulation.

- D. Certification:
 - 1. Submit certification that proposed applicator is approved for warranted work by metal roof manufacturer.
 - 2. Submit certification from authorized representative of metal roof manufacturer, stating that surfaces and conditions are acceptable for purpose of providing specified warranty.
 - 3. Submit certification from authorized representative of metal roof manufacturer, stating that proposed roof system meets design and performance criteria, and specified requirements.
 - 4. Submit certification from authorized representative of metal roof manufacturer that specified metal roof systems have been satisfactorily installed on projects of similar scope and size and have been completed for five years.
 - 5. Certification: Submit written certification that fluoropolymer coating complies with specified performance requirements.
 - 6. Submit certification from manufacturer that fabricator/installer is approved and certified to fabricate/install manufacturer warranted metal roof systems as specified herein.

- E. Design calculations: Submit design calculations, indicating compliance with specified performance criteria. Indicate fastener types and spacings. Design calculations shall bear the seal of a professional engineer licensed in the State of Georgia. Indicate that the engineer has reviewed shop drawings.

- F. Test reports:
1. Submit reports by an independent testing laboratory to support structural calculations and show compliance with specified performance criteria.
 2. Tests shall have been made for substantially identical systems within the ranges of specified performance criteria.
 3. If test data is not available or if data does not represent project conditions, Contractor shall be responsible for securing satisfactory tests by an independent testing agency acceptable to Architect, with costs of such testing borne by the Contractor.

- G. Samples:
1. Submit samples of panel section, at least 2'-0" in length by full width, indicating thickness, profile, texture and color.
 2. Submit samples of panel clips, closures and accessory items.

1.4 QUALITY ASSURANCE:

- A. Applicable standards; standards of the following, as referenced herein:
1. American Architectural Manufacturers Association (AAMA).
 2. ASTM International (ASTM).
 3. National Roofing Contractors Association (NRCA), "Roofing and Waterproofing Manual," Fifth Edition, 2001 with 2003 Update.
 4. Sheet Metal and Air Conditioning Contractors National Association (SMACNA), "Architectural Sheet Metal Manual," Sixth Edition, 2003.
 5. Steel Structures Painting Council (SSPC).
 6. Underwriters Laboratories, Inc. (UL).
- B. Manufacturer's qualifications:
1. Metal roof system manufacturer shall have been engaged in the manufacturer of metal roof systems similar to those specified herein for a minimum of ten years.
 2. Manufacturer shall submit evidence that his proposed metal roof system as specified herein has been satisfactorily installed on projects of similar scope and size, which have been completed for at least five years.
- C. Fabricator/installer qualifications:
1. Fabricator/installer shall be trained and approved by metal roof system manufacturer, with trained supervisory personnel observing and directing the work.
 2. If required, proposed fabricator/installer shall submit evidence of financial responsibility.
 3. Architect reserves the right to inspect fabrication facilities in determining qualifications.
 4. Fabricator/installer shall have satisfactorily installed metal roof systems, similar in size and scope to the specified system, which have been completed for five years.

5. Fabricator/installer shall be approved and certified to install metal roof systems which can be warranted by metal roof manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING:

- A. Protect components during fabrication, shipment, storage, handling and erection from mechanical abuse, stains, discoloration and corrosion.
- B. Maintain strippable plastic protective film on finished surfaces until panels are erected.
- C. Handle materials to prevent damage to surfaces, edges and ends of roofing sheets and sheet metal items. Damaged material shall be rejected and removed from site.
- D. Protect panels from wind-related damages.
- E. Inspect materials upon delivery. Reject and remove physically damaged or marred material from project site.
- F. Do not overload roof structure with stored materials. Do not permit material storage or traffic on completed roof surfaces.

1.6 PROJECT/SITE CONDITIONS:

- A. Protection:
 1. Provide protection or avoid traffic on completed roof surfaces.
 2. Avoid overloading roof with stored materials.
 3. Support no roof-mounted equipment directly on roofing system.
- B. Ascertain that work of other trades which penetrates roof or is to be made watertight by roof is in place and approved prior to installation of roofing.

1.7 WARRANTIES:

- A. Endorse and forward to Owner the following warranties:
 1. Manufacturer's twenty year finish warranty covering refinishing of fluoropolymer coating due to checking, crazing, peeling, chalking or fading.
 2. Manufacturer's comprehensive twenty year warranty covering roofing system installation and watertightness with no dollar limit.
 3. Warranties shall commence on Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 METAL ROOF SYSTEM:

- A. Acceptable products; subject to compliance with specified requirements.
 1. Basis of design: Berridge Manufacturing Co., Cee-Lock.
 2. Firestone Metal Products, UC-1.

3. Dimensional Metals, Inc., Inter-Lock IL20.
4. Innovative Metals Co. (IMETCO), Snap-Lock Series.
5. Petersen Aluminum Corp. (Pac-Clad), Snap-Clad.

B. Materials:

1. Panel material: Minimum 24 ga., restricted flatness steel sheet, metallic coated by hot-dip process and prepainted by coil-coating process to comply with ASTM A 755/A 755M; 50 ksi yield point, galvanized Coating Designation G-90 minimum.
2. Flashing and flat stock material: Minimum 24 ga. galvanized steel of same type and finish as panel material.

C. Characteristics:

1. Configuration: Standing seams incorporating mechanically snap-locking seams with concealed anchor clips allowing thermal movement, and factory installed sealant to prevent entrance or passage of water.
2. Seam height: 1-3/8", minimum.
3. Nominal panel width: 1'-4".
4. Panel surface: Smooth.
5. Panel length: Factory formed, full length without joints.
6. Seam cap: Provide shop-fabricated cap for seams where cut for bends. Cap shall match seam, with overlapping and sealed bend.
7. Replaceability: Individual panels shall be removable for replacement without removing adjacent panels.

D. Accessories:

1. Anchor clips: Stainless steel or hot-dipped galvanized steel, G-90 coating designation, designed to receive recessed mechanical anchor into decking. Clips shall allow free thermal expansion and contraction movement relative to the structure within the full temperature ranges specified.
2. Anchors: Stainless or corrosion-resistant steel screws designed to meet structural loading requirements.
3. Exposed fasteners: Stainless or corrosion-resistant steel self-tapping hexagonal head screws with neoprene sealing washers, #14 size, minimum; head finished to match panel color.
4. Closures: Manufacturer's standard closed cell foam or sheet metal "Z" closure:
 - a. Closed cell foam shall meet ASTM D1056-07, Type 2, Class D or ASTM D3575-00e1; factory-cut foam shall be enclosed in metal channels matching panels when used at hip and ridge.
 - b. "Z" closures shall be same material as panels, manufacturer's standard detail, with continuous sealant bead at edges, ends and contact area with adjacent materials.
5. Panel joint sealant: Specified silicone sealant or non-curing polyisobutylene tape of thickness to seal surfaces being joined.
6. Provide miscellaneous accessories for complete installation. Accessories shall be furnished by roofing system manufacturer.

2.2 METAL FINISH:

- A. Finish on exposed surfaces:
 - 1. Two coat, shop-applied, baked-on, fluoropolymer coating system based on minimum 70% Arkema Group, Kynar 500 or Solvay Solexis, Inc., Hylar 5000 resin (Polyvinylidene fluoride, PVDF), formulated by a licensed manufacturer and applied by manufacturer's approved applicator to meet AAMA 2605-05.
 - 2. Color: Match Berridge Natural White.
- B. Finish on unexposed surfaces: Neutral washout.
- C. Protective surfacing: Provide strippable plastic film covering on finished surfaces to prevent abrasion during fabrication, storage and handling.

2.3 SOFFIT SYSTEM:

- A. Acceptable products:
 - 1. Berridge Manufacturing Co., L-Panel.
 - 2. Copper Sales Div./ Firestone Building Products Co., UC-500.
 - 3. Dimensional Metals, Inc., FP1012.
 - 4. Innovative Metals Co. (IMETCO), FW 120.
 - 5. Petersen Aluminum Corp. (Pac-Clad), Flush Panel.
- B. Characteristics: Material shall be minimum 24 gage hot-dipped galvanized steel complying with ASTM A653-06a and ASTM A924-07; 12" wide, flush appearance.

2.4 ACCESSORY PRODUCTS:

- A. Metal for gutters and downspouts, :
 - 1. Panel material: 0.050" thickness aluminum alloy meeting ASTM B209-06.
 - 2. Finish: Match roof panels in color and finish.
- B. Silicone sealant for concealed joints:
 - 1. Acceptable products:
 - a. Dow Corning Corp., #795.
 - b. General Electric Co., Silpruf Sealant.
 - c. Pecora Corp., #895.
 - 2. Type: One-part silicone rubber; meeting ASTM C920-05, Type S, Grade NS, Class 25.
- C. Waterproof membrane underlayment for all areas to receive metal roofing:
 - 1. Acceptable products; subject to compliance with specified requirements:
 - a. Carlisle Coatings and Waterproofings, WIP 300HT.
 - b. Polyguard Products, Inc., Polyguard Deck Guard.
 - c. Grace Construction Products, Grace Ultra.
 - 2. Characteristics:
 - a. Type: Self-adhering rubberized asphalt sheet or butyl rubber based adhesive backed by a layer of high density cross laminated polyurethane complying with ASTM D1970-01.
 - b. Thickness: Minimum 30 mils when tested in accord with ASTM D3767-03, Method A.

- c. Tensile strength: 250 psi minimum when tested in accord with ASTM D412-06a.
 - d. Elongation: 250% when tested in accord with ASTM D412-06a, Die C Modified.
 - e. Provide primers, sealants and accessories required for a waterproof installation.
- D. Bituminous coating for separation of dissimilar materials: Cold-applied, asphalt mastic meeting SSPC-Paint 12, minimum 30 mils thickness.
- E. EPDM rubber flashing for penetrations and equipment legs: EPDM boot with aluminum base flange with hose clamp at top of boot.

2.5 FABRICATION:

- A. Shop fabricate metal roof and flashing components to the maximum extent possible, forming metal work with clear, sharp, straight and uniform bends and arrises. Hem exposed edges of flashings.
- B. Forming equipment shall have a minimum of 12 stations.
- C. Panels shall be factory tension-leveled.
- D. Form flashing components from full single width sheet. Provide shop-fabricated mitered corners, joined using closed-end pop rivets and joint sealant.
- E. Fabricate roofing and related sheet metal work in accord with approved shop drawings and applicable standards.
- F. Solder sheet metal joints prior to finishing with heavy, well heated coppers. Pre-tin joints not less than 1-1/2" wide. Provide 1" minimum soldered joints. After soldering, wash joints and neutralize remaining acid with alkaline solution.
- G. Provide linear sheet metal items in minimum 10'-0" sections, except as otherwise noted. Form flashing using single pieces for the full width. Provide shop-fabricated, mitered and joined corners, with minimum 2'-0" long legs.
- H. SMACNA Manual fabrication requirements:
 - 1. Gutters: Figure 1-2, Style A. Size gutters in accord with Tables 1-1, 1-2, 1-3 and 1-4, and Charts 1-1 and 1-2.
 - 2. Downspouts: Figure 1-32B. Size downspouts in accord with Tables 1-1, 1-2, 1-3 and 1-4, and Charts 1-1 and 1-2.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Pre-roofing conference: Prior to beginning metal roof work, hold a pre-roofing conference to review work to be accomplished.
 - 1. Contractor, Architect, metal roofing subcontractor, metal roof system manufacturer's representative and all subcontractors who have equipment penetrating roof or whose work involves access to roof shall be present.
 - 2. Contractor shall notify Architect and other attending parties at least seven days prior to time for conference.
 - 3. Contractor shall record minutes of meeting and shall distribute copies of minutes to attending parties.
- B. Examination:
 - 1. Examine alignment and placement of substrates before proceeding with installation of metal roof.
 - 2. Examine alignment and placement of penetrations before proceeding with installation of metal roof.
- C. Install waterproof membrane underlayment at all areas to receive metal roof.
 - 1. Install membrane underlayment fully adhered to substrates in accord with manufacturer's product data.
 - 2. If required, prime surfaces to receive membrane materials. Allow primer to dry until tack-free. Prime only area which can be covered with sheet membrane during work period. Reprime surfaces which are not covered within 24 hours of primer application.
 - 3. Install membrane materials with side and end laps lapped as recommended by product data. Begin installation at low points, lapping succeeding sheets to shed water.
 - 4. Membrane applications shall be fully adhered, smooth, straight and free of blisters, buckles, fishmouths and wrinkles affecting the complete adherence of the membrane. Patch and repair defective work in accord with manufacturer's product data. Replace defective areas.
 - 5. Double membrane at changes in plane by application of a centered membrane strip. Cover strip completely with full width sheet.
 - 6. Seal around protrusions and at terminations in accord with product data.
 - 7. Repair punctures and tears in membrane by patching with membrane material.

3.2 ROOF AND FLASHING INSTALLATION:

- A. Install roof and flashings in accord with approved shop drawings and manufacturer's product data, within specified erection tolerances.
 - 1. Install panels, flashing and trim with finish direction oriented in the same direction.

2. Penetrations shall occur in flat of panel. No rib shall be cut or modified to accommodate penetrations or flashing of penetrations.
- B. Isolate dissimilar metals and masonry or concrete from metals with bituminous coating. Use gasketed fasteners to prevent corrosive action between fastener, substrate and panels.
- C. Exposed fasteners shall be prefinished to match finish of panels and trim. Limit exposed fasteners to extent indicated on shop drawings.
- D. Anchorage shall allow for temperature expansion/contraction movement within specified range without stress or elongation of panels, clips or anchors. Attach clips to decking using screws of size and spacing in accord with manufacturer's product data and design calculations to resist specified uplift and thermal movement forces.
- E. Seal laps and joints in accord with roof system manufacturer's product data.
- F. Coordinate flashing and sheet metal work to provide weathertight conditions at roof terminations. Fabricate and install in accord with standards of SMACNA "Architectural Sheet Metal Manual" and NRCA "Construction Details," using continuous cleats at all exposed edges.
- G. Provide for temperature expansion/contraction movement of panels at roof penetrations and roof-mounted equipment in accord with system manufacturer's product data and design calculations.
 1. Locate penetrations in flat of panel.
 2. Provide EPDM rubber flashing boots for vents, pipes, stacks, hoses and round legs of equipment supports. Mechanically attach base flange and tighten hose clamp to provide watertight installation.
- H. Installed system shall be true to line and plane and free of dents, oilcans and physical defects.
- I. Form joints in linear sheet metal to allow for 1/2" minimum expansion at 20'-0" o. c., maximum, and 8'-0" from corners. Provide 6" wide cover plate and 1'-0" wide backup plate at intersections. Form plates to profile of sheet metal item.
- J. At joints in linear sheet metal items, set sheet metal over backup plate and set cover plate over sheet metal in two beads of specified silicone sealant, 1/4" in diameter, minimum. Extend sealant over all metal surfaces. Mate components for positive seal. Allow no sealant to migrate onto exposed surfaces.
- K. Gutters and downspouts:
 1. Construct with riveted and sealed joints, lapped 1", minimum, in direction of flow. Provide 3/4" minimum expansion joints at 30'-0" o. c., maximum. Form expansion joints in accord with SMACNA Manual, Figure 1-7, butt type.

2. Hang gutters with high points equidistant from downspouts, evenly sloped toward downspouts. Support gutters in accord with SMACNA Manual, Figure 1-16 for heavy gutters at low-slope roofs.
3. Secure downspouts to exterior walls at 6'-0" o. c., maximum, using straps and expansion type fasteners in accord with SMACNA Manual, Figure 1-35C. Lap downspout joints 1-1/2", minimum, and seal.

3.3 FIELD QUALITY CONTROL:

- A. Applicable erection tolerances; maximum variation from true planes or lines: 1/4" in 20'-0"; 3/8" in 40'-0" or more.

3.4 PROTECTION:

- A. Remove damaged work and replace with new, undamaged components.
- B. Paint edges where panels are field cut. Touch up using paint furnished by roof panel manufacturer and matching exposed panel surface finish.
- C. Remove protective film and clean exposed surfaces of roofing and accessories after completion of installation. Leave in clean condition at Date of Substantial Completion. Touch up minor abrasions and scratches in finish.

End of Section

SECTION 07 5421

TPO MECHANICALLY ATTACHED ROOFING

PART 1 - GENERAL

1.1 SUMMARY:

- A. Work of this section includes application of a mechanically attached thermoplastic TPO roof membrane system installed over metal roof decks, including related insulation and flashings.
- B. Definitions: "Single Ply" as used on drawings, shall be defined to mean TPO mechanically attached roofing system.
- C. Related work specified elsewhere:
 - 1. Rough carpentry.
 - 2. Structural insulation panels.
 - 3. Flashing and sheet metal.

1.2 SUBMITTALS:

- A. Product data:
 - 1. Submit a complete listing of each particular component or element of the roof membrane system that is required, specified or proposed for use on this project.
 - a. Identify each component or element proposed for use by product number, name, and pertinent characteristics.
 - b. Identify each component or element by indicating the function or location of each within the assembly.
 - 2. Submit product description and complete installation instructions, including standard flashing details, for insulation, roofing and accessory materials. Indicate specific systems and procedures proposed for use, deleting inapplicable data. Indicate fastener types and spacings, including mechanical fasteners for insulation attachment to meet specified wind uplift requirements.
- B. Shop drawings:
 - 1. Submit plans, drawings, and details illustrating the following:
 - a. Roof plan indicating fastening patterns, layout of each layer, relative elevations and slopes.
 - b. Edge flashing conditions.
 - c. All penetrations.
 - d. Typical flashing details as herein referenced and as shown on the drawings.
 - e. Flashing details not specifically indicated on drawings or in manufacturer's product data details.
 - f. All other pertinent data required for this project.

2. Submit for tapered insulation from roof system manufacturer's authorized tapered fabricator. Indicate layout of insulation showing slopes, crickets and valley locations. Include longitudinal and transverse sections, and sections showing insulation layers. Indicate method of attachment.
 3. Submit for flashing details not specifically indicated on drawings or in manufacturer's product data details.
- C. Samples; submit as follows:
1. Anodized aluminum: 6" by 6" samples of anodized aluminum, indicating full range of color to be expected in finish work.
 2. Special finishes: 6" by 6" samples for Architect's color selection.
- D. Intent to warrant and certifications: Submit an Intent to Warrant executed by authorized representative of roof membrane system manufacturer, indicating that manufacturer has reviewed drawings and specifications, conditions affecting the work and the relationship of roof membrane system with related work, and that manufacturer proposes to provide warranty as specified herein without further stipulation.
1. Submit certification that proposed applicator is approved for warranted work by roof membrane system manufacturer.
 2. Submit certification from authorized representative of roof membrane system manufacturer stating that specified system and materials, as well as indicated surfaces and conditions, are acceptable for purpose of providing specified warranty.
- E. Field reports: Submit manufacturer's certified field reports as herein specified.
- F. Submittals schedule: Obtain Architect's approval of submittals prior to prerooting conference.
- 1.3 DELIVERY, STORAGE AND HANDLING:
- A. Deliver materials to the site in their original, tightly sealed containers or unopened packages, all clearly labeled with the manufacturer's name, product identification and lot number.
 - B. Protect all materials from damage during transit, handling, storage and installation.
 - C. Store materials in dry, covered storage, off ground, in accord with manufacturer's product data. Handle roll goods to prevent damage to edges. Protect materials from exposure to spark or flame. Maintain temperatures in storage areas between 50 degrees F. and 90 degrees F. Damaged materials shall be replaced at Contractor's expense.
 - D. Store solvent-bearing materials in dry, cool storage and keep lids tight on opened containers to prevent solvent escape.

- E. Store cartons level, standing in upright position. Do not stack cartons. Protect open top containers from debris and precipitation.

1.4 JOB CONDITIONS:

- A. Apply roof membrane system in dry weather when temperature is 40 degrees F. or above. Undertake application only when forecasted weather conditions are in accord with requirements of membrane manufacturer's product data.
- B. Protection:
 - 1. Protect building from damage and defacing by roofing operations.
 - 2. Restore or replace adjacent work or materials damaged during handling of roofing materials.
 - 3. Provide protection or avoid traffic on completed roof surfaces.
- C. Surfaces to receive roof membrane system shall be cured, clean, smooth, free of voids or projections, grease, oil, contaminants and foreign material, and are in proper condition to receive roof membrane system.
- D. Ascertain that the work of other trades penetrating roof membrane system or intended to be made watertight by membrane application is in place and accepted prior to installation of roof system. Schedule roofing application to minimize traffic on membrane.

1.5 QUALITY ASSURANCE:

- A. Qualifications of applicator: Applicator shall be an approved roofing contractor authorized or certified to install roofing systems which can be warranted by the roofing materials manufacturer. Applicator shall be one who can furnish certification from the roofing manufacturer certifying that the applicator has satisfactorily applied the type of roof specified on projects which have been completed for at least five years.
- B. Reference standards:
 - 1. ASTM International (ASTM), standards as referenced herein.
 - 2. Factory Mutual Engineering Corp. (FM):
 - a. "Wind Forces on Buildings and Other Structures," Loss Prevention Data Sheet 1-7.
 - b. "Wind Loads to Roof Systems and Roof Deck Securement," Data Sheet 1-28.
 - c. "Roof Systems," Loss Prevention Data Sheet 1-28R/1-29R.
 - d. "Above-Deck Roof Components," Loss Prevention Data Sheet 1-29.
 - e. "Perimeter Flashing," Loss Prevention Data Sheet 1-49.
 - 3. National Roofing Contractors Association (NRCA): "Roofing and Waterproofing Manual", Fifth Edition, 2001 with 2003 and 2006 Updates.
 - 4. Underwriters Laboratories, Inc. (UL):
 - a. "Building Materials Directory," 2005 Edition.

- b. "Fire Resistance Directory," 2005 Edition.
- C. Wind uplift: Comply with FM requirements for wind uplift resistant installation as required by code.
- D. Roofing system components, including flashing materials, shall be products of a single manufacturer. Insulation shall be the product of the roofing manufacturer or acceptable and approved in writing by the roofing manufacturer for installation with roof system to obtain specified warranty.

1.6 WARRANTIES:

- A. Roof membrane material warranty: Provide manufacturer's standard 20-year material warranty for roof membrane material against manufacturing defects, including factory-made seams and wind-related damage.
- B. Manufacturer's full system warranty: Furnish manufacturer's 20-year comprehensive watertight warranty covering roofing, insulation, accessories and related flashings. Warranty shall include labor and materials to correct defects without limit.
- C. Warranties shall begin at Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ROOF INSULATION:

- A. Roof insulation thickness and thermal value shall comply with energy code requirements, minimum R-value as indicated on drawings.
- B. Isocyanurate roof insulation:
 - 1. Type: Rigid isocyanurate closed-cell foam boards, permanently bonded to non-asphaltic with non-asphaltic glass facing sheets complying with ASTM C1289-06, Class 1, Type I.
 - 2. Number of layers: Minimum two layers, with first layer minimum 2" thickness.
 - 3. Face size: Minimum 4'-0" by 4'-0".
 - 4. Overall thickness: As indicated on drawings.
 - 5. Long-term thermal resistance (LTTR) R-value in accord with ASTM C1289-06: R-value as indicated on drawings for total thickness indicated.
 - 6. Density: Minimum 2 pcf.
 - 7. Blowing agents: Manufactured using non-HCFC, zero ozone depleting blowing agents.
 - 8. Tapered units: Provide tapered isocyanurate insulation as required to achieve slopes indicated on the drawings; minimum 1/4" slope per foot.
- C. Insulation fastener system; Type required by roofing system manufacturer and meeting characteristics and wind uplift further specified:

1. Corrosion resistance: Pass FM 4470 Corrosion Test, modified DIN 50018 standard, with a maximum of 15 percent red rust after 15 wet and dry acidic atmosphere cycles in Kesternich cabinet.
2. Plates: Minimum 3" diameter, non-corrosive material.
3. Wind uplift: Comply with code and FM requirements for wind uplift resistance.

2.2 ROOF MEMBRANE SYSTEM:

A. Acceptable products:

1. Basis of design: Firestone Building Products, ReflexEON Single Ply TPO Roof System, Energy Star Certified System.
2. Carlisle Syntech, Inc.
3. GenCorp Polymer Products/Genflex.

B. TPO membrane characteristics:

1. Material: Thermoplastic Polyolefin roofing membrane.
2. Material thickness: Minimum 0.060".
3. Breaking strength: 410 lbf/in, when tested in accord with ASTM D751-06.
4. Tear strength: 132 lbf minimum, when tested in accord with ASTM D751-06.
5. Elongation: 30% when tested in accord with ASTM D751-06.
6. Brittleness point: -40°F when tested in accord with ASTM D2137-05.
7. Weight change: 1% change in mass, when tested in accord with ASTM D471-06.
8. Dimensional stability: 0.15% change when tested in accord with ASTM D1204-02.
9. Ozone resistance: Pass, when tested in accord with ASTM D1149-99.
10. Factory seam strength: 65 lbf, when tested in accord with ASTM D751-06.
11. Puncture resistance: 300 lbf, when tested in accord with FTM 101C, Method 2031.
12. Solar reflectance: .84 when tested in accord with ASTM C1549-04.
13. Resistance to chemicals and oils: No swelling, cracking or leaking when in contact with ammonia, animal fats and other oils, acids and chemical reagents listed in membrane manufacturer's literature.
14. Sheet size: Maximum size resulting in minimum number of field-made seams in completed installation.
15. Membrane flashing: Same as roof membrane.
16. Colors: Standard white color.

C. Membrane adhesives, sealants, mastics and primers: Premium quality products and materials as recommended or manufactured by roofing membrane manufacturer.

D. Membrane fastener system: Type required by roofing system manufacturer's product data and meeting specified characteristics, wind uplift resistance and code requirements.

- E. Prefabricated accessories: Provide manufacturer's premium quality membrane-clad and prefabricated products and materials, including flashing elements, pipe boots, corners and other standard prefabricated elements.
- F. System wind uplift resistance: Meet code requirements for wind uplift resistance rating.

2.3 ACCESSORY MATERIALS:

- A. Curbs, cants, tapered edge strips and blocking: Pressure-preservative treated lumber as specified in Rough Carpentry section.
- B. Compressible insulation for non-wall supported decks:
 - 1. Material: 2.25 pcf density, unfaced fiberglass.
 - 2. Thickness: As required to fill space between wood blocking and parapet; compressed 30%.
 - 3. Compressive strength: 10 psf.
 - 4. R value at 75 degrees F.: 4.3.
- C. Flexible vapor retarder for non-wall-supported decks:
 - 1. Type: Non-reinforced, homogeneous vinyl sheet.
 - 2. Thickness: Minimum 20 mils.
 - 3. Elongation: Maximum 250 percent in accord with ASTM D412-06a.
 - 4. Substrate and joint adhesives: Vapor retarder manufacturer's adhesives recommended for use with vapor retarder material.
- D. Roof fascias and other miscellaneous flashing and sheet metal: Refer to Flashing and Sheet Metal section.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Pre-roofing conference: Prior to beginning roofing work, a pre-roofing conference will be held to review work to be accomplished.
 - 1. Contractor, Architect, roofing subcontractor, roof membrane system manufacturer's representative and subcontractors who have equipment penetrating roof or whose work involves access to roof shall be present.
 - 2. Contractor shall notify all parties at least seven days prior to time for conference.
 - 3. Contractor shall record minutes of meeting and distribute to attending parties.
- B. Contractor shall provide proper surfaces to receive roofing and flashing. The roofing applicator shall notify the Contractor in writing of any and all defects in the receiving surfaces, and work shall not proceed until such defects have been corrected. The entire area to be roofed shall be inspected by the roofing applicator to determine that it is free of debris and other gross irregularities.
- C. Immediately prior to application of roof membrane system, sweep roof deck, removing debris and foreign material.

- D. Non-wall-supported decks: Install in accord with NRCA Detail TP-6:
1. Fasten wood nailers horizontally to roof deck only.
 2. Drape flexible vapor retarder into wall/deck cavity, anchoring at top of wood nailer at 8" o.c. Seal laps in vapor retarder in accord with manufacturer's instructions. Install compressible insulation vertically between wall and wood nailers.
 3. Install compressible insulation to minimum 4" depth; top of insulation shall be flush with top of nailer. Return vapor retarder over top of compressible insulation and anchor to top of wood nailer at 8" o.c.
 4. Install flexible tubing over top of compressible insulation.
 5. Install roof and flashing membranes as herein specified.

3.2 RIGID INSULATION INSTALLATION:

- A. Install insulation in accord with FM 1-28. Install in two layers, with joints staggered between layers. Stagger end joints in adjacent boards. Butt edges for snug contact.
- B. Installation over metal decks: Install insulation in accord with FM I-28. Install using specified mechanical fasteners. Attach first layer of insulation to metal deck using specified mechanical fasteners, meeting FM 1-90 wind uplift classification. Bear edges of board on deck ribs.
- C. Solid-mop second and subsequent layers of insulation, including tapered insulation and crickets, in solid cold adhesive mopping at rate recommended by insulation manufacturer's product data. Step into place to ensure full adhesion; do not slide into place.
- D. Install only as much roof insulation each work period as can be covered by roofing by end of same work period.
- E. Mechanically anchor cant strips and tapered edge strips to wood blocking, in accord with FM Data Sheet 1-49. Butt lengths together and to adjacent construction. Install cant strips at abutting vertical surfaces, except those which have built-in cants.

3.3 ROOF MEMBRANE SYSTEM INSTALLATION:

- A. Install roof membrane system, mechanically attached, in accord with manufacturer's product data. Secure with screw and disc fasteners at spacings recommended by product data, achieving required wind uplift resistance.
- B. Lay out roof membrane sheets with seams located in accord with approved shop drawings. Allow membrane to relax for minimum 15 minutes. Lap laid out sheets with overlap as required by manufacturer's product data.
- C. Clean seam areas thoroughly and heat weld lap seams using roof membrane system manufacturer's required heat welding procedures. Seal exposed edges with edge sealant at each lap.

- D. Mechanically attach roof membrane at perimeter, terminations and penetrations in accord with manufacturer's product data and approved shop drawings.
- E. Membrane applications shall be fully secured, smooth, straight and free of blisters, buckles, fishmouths and wrinkles affecting the complete adhesion of roof membrane. Patch and repair defective work in accord with manufacturer's product data. Areas which exhibit defective areas or generally poor or improper workmanship shall be removed and replaced, as directed by Architect.
- F. Flashing:
1. Install base flashing in accord with manufacturer's product data and approved shop drawings using same material as roof membrane. Lap joints and seal.
 2. Fully adhere flashing membrane to substrates.
 3. At vertical surfaces, install flashing membrane shingle fashion, starting at lowest edge, overlapping membranes each course. Install peel strips at 30" o.c. vertically, as membrane is applied.
 4. Wrap top of flashing membrane over parapet walls and down building face 2" minimum; cover with metal flashing as specified in Flashing and Sheet Metal section.
 5. Where flashing top edge does not return over parapet wall, cover top edge of flashings with metal termination bars and counterflashing.
 6. Additional flashing detail requirements:
 - a. Area dividers: NRCA Detail TP-8.
 - b. Equipment support curbs: NRCA Detail TP-9.
 - c. Isolated stack flashing: NRCA Detail TP-17.
 - d. Equipment support stands: NRCA, Detail TP-10.
 - e. Structural roof member through roof deck: NRCA, Detail TP-15.
 - f. Plumbing vent, with premanufactured boot: NRCA, Detail TP-18A.
- G. Flash at curbs and similar vertical surfaces same as base flashings. If required by roof membrane manufacturer, provide cant strips at curbs and equipment not having integral curbs. Provide metal counterflashing at curbs which are not self-flashing.
- H. Install fascias in accord with membrane manufacturer's product data and approved shop drawings and Flashing and Sheet Metal section.
- I. Pipe penetrations: Comply with membrane manufacturer's product data, NRCA Detail TP-18A, and approved shop drawings for pipe penetration flashing.
1. Flash using prefabricated flashing boots, or flash using two layers of flashing membrane adhered to pipe and roof, in layers. Extend first flashing layer a minimum of 6" onto roof and a minimum of two inches up pipe. Extend second layer a minimum of 4" onto roof and a minimum of 8" onto pipe, above roof surface. Seal flashing membrane layers to roof membrane.
 2. At top of flashing provide drawband. Finish exposed edges with lap sealant.

- J. At end of each day's work, provide water cutoff at exposed edges of roof membrane. Remove cutoffs prior to beginning next day's work.
- K. Remove all trash, tools, debris and extraneous materials from roof areas during the course of work and upon completion of roof installation.
- L. Upon completion of roof membrane system installation, and before installation of decorative membrane, roof membrane system manufacturer's representative shall inspect installation to ascertain that the roof membrane system has been installed according to manufacturer's published product data, and approved shop drawings.
 - 1. Defects or deviations from manufacturer's product data and approved shop drawings shall be remedied as required to secure manufacturer's warranty.
 - 2. Reinspect installation until defects and deviations are corrected.
 - 3. Provide written report of each inspection, documenting defects, deviations and corrective measures.
 - 4. After corrections have been approved, include statement in final report that roof is installed correctly and is suitable for specified warranty.
 - 5. Submit one copy of each report to Architect immediately following each inspection.
- M. Completed roof system shall be free of defects, including leaks and ponded water. Within 48 hours of measurable precipitation, no ponded water shall remain on the completed roof.

End of Section

SECTION 07 6000

FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 SUMMARY:

- A. Related work specified elsewhere:
 - 1. Roofing system.
 - 2. Joint sealants.
 - 3. Self-adhering sheet flashing.

1.2 SUBMITTALS:

- A. Shop drawings: Indicate material types, sizes, shapes, thicknesses, finishes, fabrication details, anchors, connections, expansion joints and relation to adjacent work. Details and profiles shall be drawn at full scale.
- B. Product data: Indicate product description, finishes and installation instructions for all manufactured products, including interface with adjacent materials and surfaces.
- C. Samples; submit as follows:
 - 1. Special finishes: 6" by 6" samples for Architect's color selection.
 - 2. Manufactured expansion joint covers, copings, fascias, flashing reglets: 1'-0" length in style and finish specified.
- D. Submittals schedule: Obtain Architect's acceptance of submittals prior to pre-roofing conference.

1.3 QUALITY ASSURANCE:

- A. Applicable standards as referenced herein:
 - 1. American Architectural Manufacturers Association (AAMA).
 - 2. American National Standard Institute/Single Ply Roofing Institute (ANSI/SPRI), as referenced herein.
 - 3. ASTM International (ASTM).
 - 4. National Roofing Contractors Association (NRCA), "Roofing and Waterproofing Manual", Fifth Edition, 2001 with 2003 Update.
 - 5. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), "Architectural Sheet Metal Manual," Sixth Edition, 2003.
 - 6. Steel Structures Painting Council (SSPC), standards as referenced herein.

1.4 DELIVERY, STORAGE AND HANDLING:

- A. Store materials off ground, under cover. Protect from damage and deterioration.
- B. Handle materials to prevent damage to surfaces, edges and ends of sheet metal items. Damaged material shall be rejected and removed from site.

1.5 WARRANTIES:

- A. Warrant flashing and sheet metal work to be free of defects in materials and workmanship. Warranty period shall be five years beginning at Date of Substantial Completion.
- B. Finish warranty: Warrant fluoropolymer coating to remain free of checking, crazing, peeling, chalking or fading for a period of twenty years, beginning at Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS:

- A. Aluminum: 3003-H14 alloy, meeting ASTM B209-06.
 - 1. Miscellaneous flashing and sheet metal: 0.032" thickness.
- B. Fasteners: Stainless steel.
 - 1. Nails: Flat head, needle point, not less than 12 ga. and of sufficient length to penetrate substrate 1" minimum.
 - 2. Expansion shields: Lead or bronze sleeves.
 - 3. Screws: Self-tapping type, with round heads.
 - 4. Bolts: Furnished complete with nuts and washers.
 - 5. Rivets: Round head, solid type.
 - 6. Blind clips and cleats: Same gauge as sheet metal.
- C. Silicone sealant for concealed joints:
 - 1. Acceptable products:
 - a. Dow Corning Corp., #795.
 - b. General Electric Co., Silpruf Sealant.
 - c. Pecora Corp., #895.
 - 2. Type: One-part silicone rubber; meeting ASTM C920-05, Type S, Grade NS, Class 25.
- D. Bituminous coating for separation of dissimilar materials: Cold-applied, asphalt roofing cement meeting SSPC-Paint 12, minimum 30 mils thickness.

2.2 FINISHES:

- A. Fluoropolymer coating finish:
 - 1. Two coat, shop-applied, baked-on fluoropolymer coating system based on minimum 70% Arkema Group, Kynar 500 or Solvay Solexis, Inc., Hylar 5000 resin (Polyvinylidene fluoride, PVDF), formulated by a licensed manufacturer and applied by manufacturer's approved applicator to meet AAMA 2605-05.
 - 2. Color: Standard color as selected by Architect.
 - 3. Finish on unexposed surfaces: Mill finish.
 - 4. Work to receive fluoropolymer coating includes flashing and sheet metal exposed to view from building elevations.

2.3 SHEET METAL FABRICATION:

- A. Fabricate sheet metal work in accord with approved shop drawings and applicable standards. Form sheet metal work with clear, sharp and uniform arrises. Hem exposed edges. Form curved components to radius indicated on the drawings, without deformation in metal.
- B. In aluminum sheets less than 0.040" thick, make joints using flatlock seams, 3/4" in width. Fill seams with exterior sealant. Make joints in thicker sheets using seaming or by Tungsten Arc Welding (TIG) or Gas Metal Arc Welding (MIG) processes, using appropriate filler alloy.
- C. Provide linear sheet metal items in 10'-0" to 12'-0" sections, except as otherwise noted. Form flashing using single pieces for the full width. Provide shop-fabricated, one-piece corners and transition pieces, with maximum 2'-0" long legs.
- D. Make riveted joints using solid shank rivets or pop rivets as applicable. Pop rivets shall be closed end type.

PART 3 - EXECUTION

3.1 SHEET METAL INSTALLATION:

- A. Install work in accord with approved shop drawings and applicable standards. Sheet metal items shall be true to line, without buckling, creasing, warp or wind in finished surfaces.
- B. Coordinate flashing at roof surfaces with roofing work to provide weathertight condition at roof terminations.
- C. Perform field joining of lengths as specified for shop fabrication.
- D. Isolate dissimilar materials to prevent electrolysis. Separate using bituminous coating.
- E. Seaming: Form seams in direction of flow. Aluminum seams shall be filled with exterior sealant. Lap seams occurring in members sloping 45° or more than 4", minimum; bed in flashing cement.
- F. Secure sheet metal items using continuous cleats, clips and fasteners as indicated. Perform no exposed face fastening.
- G. Fastening:
 - 1. Nails: Confine to one edge only of flashing 1'-0" or less in width. Space nails at 4" o. c., maximum. Provide neoprene washers for nails.
 - 2. Cleats: Continuous, formed to profile of item being secured.
 - 3. Clips: Minimum 2" wide by 3" long, formed to profile of item being secured. Space at 2'-0" o. c., maximum.

- H. Form joints in linear sheet metal to allow for 1/2" minimum expansion at 12'-0" o. c., maximum, and maximum 2'-0" from corners. Provide 6" wide cover plate and 1'-0" wide backup plate at intersections. Form plates to profile of sheet metal item.
- I. At joints in linear sheet metal items, set sheet metal over backup plate and set cover plate over sheet metal in two beads of specified silicone sealant, 1/4" in diameter, minimum. Extend sealant over all metal surfaces. Accurately mate components for positive seal. Allow no sealant to migrate onto exposed surfaces.
- J. Where sheet metal is indicated as flashing above and below heads of doors, windows and other penetrations, extend flashing minimum 8" beyond opening, each side. Turn ends up minimum 2" to form end dams and to ensure drainage through weeps and not into cavity.

End of Section

SECTION 07 6500

FLEXIBLE FLASHING

PART 1 - GENERAL

1.1 SUBMITTALS:

- A. Product data: Indicate material type, composition, thickness and installation procedures.
- B. Samples: Submit 1'-0" by 1'-0" samples of material.

1.2 QUALITY ASSURANCE:

- A. Applicable standards: ASTM International (ASTM), standards as referenced herein.

PART 2 - PRODUCTS

2.1 SELF-ADHERING, FLEXIBLE MEMBRANE FLASHING:

- A. Acceptable products, subject to compliance with specified requirements:
 - 1. Carlisle SynTec, Inc., CCW-705-TWF.
 - 2. Fortifiber Building Products Systems Group, FortiFlash.
 - 3. Grace Construction Products, Perm-A-Barrier Wall Flashing.
 - 4. W.R. Meadows, Inc., Sealtight Air-Shield.
- B. Characteristics:
 - 1. Type: Adhesive-backed rubberized asphalt compound, bonded to 8 mil, high density, cross-laminated polyethylene film. Adhesive side coated with release paper.
 - 2. Membrane thickness: Minimum 40 mils.
 - 3. Surface conditioner/primer and mastic/sealant: Membrane manufacturer's standard components. Surface conditioner/primer shall be formulated to provide tenacious bond with all substrates, including those coated with dampproofing or asphaltic materials.

2.2 WINDOW AND DOOR FLASHING:

- A. Acceptable products, subject to compliance with specified requirements:
 - 1. Carlisle Coatings and Waterproofing, Inc., Window and Door Flashing.
 - 2. Fortifiber Building Products Systems Group, FortiFlash.
 - 3. Grace Construction Products, Vycor® V40 Weather Barrier Strips.
 - 4. W.R. Meadows, Inc., Sealtight Air-Shield.

- B. Characteristics:
1. Type: Adhesive-backed rubberized asphalt compound, bonded to 8 mil, high density, cross-laminated polyethylene film. Adhesive side coated with release paper.
 2. Membrane thickness: Minimum 40 mils.
 3. Surface conditioner/primer and mastic/sealant: Membrane manufacturer's standard components. Surface conditioner/primer shall be formulated to provide bond with substrates, including those coated with dampproofing or asphaltic materials.

PART 3 - EXECUTION

3.1 INSTALLATION OF SELF-ADHERING MEMBRANE FLASHING:

- A. Install through-wall flashing in accord with manufacturer's product data and as specified herein.
- B. Install through-wall flashing at exterior door jambs and heads, window heads and sills, other wall openings, masonry copings, lintels, shelf angles and at weep hole locations, continuous, in same bed joint as weep hole.
- C. Prime substrates to receive membrane flashing using specified primers, and complying with membrane manufacturer's instructions. Primed substrates shall allow full bond of adhesive side of membrane to substrates. Should full bond at top edge not be immediately evident, mechanically attach a 1" wide, continuous, hot-dipped galvanized steel termination bar at top edge of flashing, against backup substrate, fastened at 2'-0" o.c. maximum.
- D. At masonry and concrete backup:
1. At double wythe masonry walls, start self-adhering membrane flashing 1/2" in from outside face of exterior wythe, extend through cavity, rising not less than 10", and terminate minimum 1" above mortar joint of interior wythe, in accord with membrane manufacturer's details. Seal top edge with continuous bead of mastic.
 2. At concrete walls, start self-adhering membrane flashing 1/2" in from outside face of exterior wythe, extend through cavity, rising not less than 10". Terminate against substrate, in accord with membrane manufacturer's details. Seal top edge with continuous bead of mastic.
 3. Overlap flashing 2" and roll all overlaps with a steel hand roller. Apply a bead of mastic/sealant along top edge, seams and cuts of flashing in accord with product data.
 4. Top flashing with full bed of fresh mortar as masonry is continued.
- E. At stud walls with masonry veneer: Start flashing 1/2" in from outside face of exterior wythe, extend through cavity, rising not less than 8", and terminate against sheathing.
1. Set in continuous 1-1/2" wide bed of adhesive, and mechanically fastened to each framing stud.

2. Coordinate flashing installation with application of building felt to ensure felt overlaps upper edge of flashing in shingle fashion.
 3. Overlap flashing 2" and roll all overlaps with a steel hand roller. Apply a bead of mastic/sealant along top edge, seams and cuts of flashing in accord with product data.
 4. Top flashing with full bed of fresh mortar as masonry is continued.
- F. Extend flashing minimum 8" beyond openings, each side. Turn ends up minimum 2" to form enddams and to ensure drainage through weeps and not into cavity.
- G. Install in maximum lengths to avoid joints. Fold corners without cutting. Apply a detail coat of liquid mastic over the folds.
- H. Adhere flashing to shelf angle. Provide adhesive cant to force water to exterior.
- I. Ensure that membrane flashing is provided with operable weeps spaced and located as specified in Brick Masonry section. Weeps shall be above finished grade. For flashing at roofing or back of parapet wall conditions, place lowest flashing joints and weeps in joint just above reglets or termination of top edge of roof base flashing.

3.2 INSTALLATION OF WINDOW AND DOOR FLASHING

- A. Install flashing at heads, jambs and sills of openings in accord with manufacturer's product data.
- B. Prime substrates to receive flashing using specified primers, and complying with membrane manufacturer's instructions. Primed substrates shall allow full bond of adhesive side of flashing to substrates. Mechanically attach vertical terminations at each stud location.
- C. Turn flashing out 8" onto face of sheathing and masonry back-up and extend to inside face of rough opening.
1. Install flashing at sill first.
 2. Install flashing at jamb so that flashing laps over sill flashing.
 3. Install flashing at head so that flashing laps over jamb flashing.

End of Section

SECTION 07 8400

FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY:

- A. Related work:
 - 1. Concrete.
 - 2. Precast architectural concrete.
 - 3. Mortar and grout.
 - 4. Brick masonry.
 - 5. Concrete unit masonry.
 - 6. Structural steel.
 - 7. Metal fabrications.
 - 8. Rough carpentry.
 - 9. Thermal insulation.
 - 10. Exterior insulation and finish system (EIFS).
 - 11. Joint sealants.
 - 12. Gypsum board.
 - 13. Fire protection specialties.
 - 14. Mechanical.
 - 15. Plumbing.
 - 16. Electrical.

1.2 SUBMITTALS:

- A. Shop drawings: Submit detailed drawings of each type and size penetration through fire-rated construction, indicating materials, dimensions, assembly construction and rating. Indicate UL Through-Penetration Firestop System Numbers or Devices for each type penetration.
- B. Product data: Submit product data and installation instructions for each type of installation. Include installation details and test reports indicating that firestopping materials, systems and devices meet specified requirements and design criteria. Indicate UL Classification marking.

1.3 QUALITY ASSURANCE:

- A. Applicable standards; standards of the following, as referenced herein:
 - 1. ASTM International (ASTM).
 - 2. National Fire Protection Association (NFPA).
 - 3. Underwriters Laboratories, Inc. (UL).
- B. Design criteria:
 - 1. Test through-penetration firestop systems and devices in accord with ASTM E814-06 with a minimum positive differential pressure of 0.03" water column.
 - a. F rating shall equal or exceed the rating of the fire-resistive construction assembly through which the penetration is made.
 - b. T rating at floor penetrations located outside of shaft enclosures shall equal one-half of the required fire-resistive rating of the floor construction.

2. Firestop systems using cementitious fill materials shall not be permitted.
3. Systems shall be free of asbestos and volatile organic compounds (VOCs), noxious fumes and strong odors.
4. Firestopping used for this project shall be FMR approved as listed in the current edition of the FMR Building Material Approval Guide.

1.4 JOB CONDITIONS:

- A. Coordinate firestopping installation with other work requiring penetrations through fire-resistive construction. Install penetrating elements prior to installation of firestopping systems or devices.
- B. Secure inspection and approval of firestopping work by building officials prior to concealment.
- C. Support penetrating elements independently of firestopping systems or devices.

PART 2 - PRODUCTS

2.1 THROUGH-PENETRATION FIRESTOP SYSTEMS:

- A. Acceptable manufacturers; subject to compliance with specified requirements:
 1. Hilti USA.
 2. 3M Fire Protection Products.
 3. Nelson Firestop Products.
 4. Rector Seal Corp.
 5. Specified Technologies, Inc. (STI).
 6. Tremco, Inc.
 7. Grace Construction Products.
- B. System description: Field-constructed firestopping for penetrations through walls and floors composed of specified materials and accessories assembled in accord with Through-Penetration Firestopping System Numbers, listed in UL Building Materials Directory, current Edition, and tested in accord with ASTM E814-06.
- C. Materials: UL Classified for use in through-penetration firestop systems.
 1. Firestop sealant: Single-component, elastomeric silicone or endothermic latex sealant compound; self-adhering, flexible and watertight; non-sag and self-leveling types as required.
 2. Firestop foam: Two-part, room temperature vulcanizing, silicone elastomer, non-combustible foam void seal.
 3. Intumescent sealants and putties: Single-component, synthetic, organic/inorganic intumescent elastomers.
 4. Intumescent wrap strips: One-part, organic/inorganic, intumescent elastomeric sheet; aluminum foil-faced one side.

5. Intumescent composite sheets: Composite sheets composed of organic/inorganic intumescent elastomeric core bonded on one side to 28 ga. galvanized steel sheet and other side reinforced with steel wire mesh, covered with aluminum foil.
6. Mineral wool or ceramic fiber safing: Non-combustible fiber tested in accord with ASTM E136-04, with melting point in excess of 2000 degrees F.; flame spread of 15 maximum and 0 smoke development when tested in accord with ASTM E84-07. Thickness and density shall be as required by UL Through-Penetration Firestop System designs.

D. Accessories:

1. Primers, adhesives and backer rods: As required by manufacturer's product data and system designs.
2. Forming, damming and packing materials: Types as indicated in UL Through-Penetration Firestop Systems.
3. Restricting collars: Manufacturer's standard design as required for firestop system.
4. Fasteners, anchor clips, sleeves, clamps, spacers, ties, cover plates and miscellaneous accessories: Provide as required by manufacturer's product data and in accord with UL Through-Penetration Firestop System designs.

2.2 THROUGH-PENETRATION FIRESTOP DEVICES:

A. Acceptable manufacturers; subject to compliance with specified requirements:

1. Hilti USA.
2. Isolatek International, Inc.
3. Nelson Firestop Products.
4. ProSet Systems, Inc.
5. Specified Technologies, Inc. (STI).
6. Tremco, Inc.
7. Grace Construction Products.

B. Types: Factory-assembled, self-contained firestopping devices for penetrations through walls and floors; UL Classified for Through-Penetration Firestop Devices as listed in UL Building Materials Directory, current Edition, and tested in accord with ASTM E814-06.

C. Accessories: Provide sealants, adhesives, fasteners, sleeves, clamps, spacers, anchor clips, ties and accessories in accord with manufacturer's product data and as required for complete installation.

2.3 FIRESTOP SEALANTS:

A. Acceptable products; subject to compliance with specified requirements:

1. Hilti USA, CP 601S Firestop Sealant.
2. Nelson Firestop Products, CLK.
3. 3M Fire Protection Products, Fire Barrier Silicone Sealant 2000 N/S.
4. Rector Seal Corp., Metacaulk 835+.
5. Specified Technologies, Inc. (STI), SpecSeal Pen 300 Silicone Joint Sealant.

6. Tremco, Inc., Fyre-Sil.
 7. Grace Construction Products, FlameSafe Silicone Sealant.
- B. Characteristics: Single-component, self-adhering, flexible, watertight, elastomeric silicone sealant compound; UL Classified. Provide self-leveling type for horizontal applications, non-sag type for all other applications.

2.4 SAFING:

- A. Acceptable products; subject to compliance with specified requirements:
1. Fibrex, Inc., FBX Safing Insulation.
 2. Tremco, Inc., Cerablanket F.S.
 3. USG Interiors, Inc., Thermafiber Safing Insulation.
- B. Characteristics:
1. Material: Semi-rigid mineral fiber insulation, meeting ASTM C665-06, Type 1.
 2. Density: 4.0 pcf.
 3. Thickness: As required to meet specified requirements.
 4. Facing: Unfaced.
 5. Fire resistance properties:
 - a. Melting point: Minimum of 2000°F. when tested in accord with ASTM C24-01(2006).
 - b. Non-combustible: As defined by ASTM E136-04 and NFPA.
 - c. Fire hazard characteristics: Maximum flame spread of 15 and smoke development of 5 when tested in accord with ASTM E84-07 (unfaced).

PART 3 - EXECUTION

3.1 JOB MOCK-UP:

- A. Install one of each type firestopping assembly for review by Architect prior to commencement of firestopping work. Notify Architect at least 36 hours in advance for observation of mock-up installations, including check for objectionable or noxious fumes or odors. Should mock-ups be unacceptable, prepare additional mock-ups until acceptable to Architect.
- B. Following Architect's review, identify and preserve mock-ups as a standard of quality for remaining firestopping work. Acceptable mock-ups may remain as part of the finished work.

3.2 EXAMINATION:

- A. Examine areas to receive firestopping materials prior to beginning work. Verify that opening areas and dimensions for penetrations to receive firestopping systems and devices do not exceed design requirements.
- B. Remove projections interfering with installation. Prepare surfaces in accord with manufacturer's product data and UL Through-Penetration Firestop System Numbers.

3.3 INSTALLATION:

A. General:

1. Comply with manufacturer's product data and UL Through-Penetration Firestop System Numbers.
2. Install firestopping materials fitted to adjacent construction to fill voids.
3. Firestop penetrations through fire-rated walls, partitions, floors and floor/ceiling assemblies with tested assemblies in accord with ASTM E119-07 or with a through-penetration firestop system or device when tested in accord with ASTM E814-06.
4. Firestopping shall comply with code requirements.
5. Identification:
 - a. Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other wall required to have protected openings shall be effectively and permanently identified with signs or stenciling in a manner acceptable to the Authority having Jurisdiction.
 - b. Such identification shall be above any decorative ceiling and in concealed spaces.
 - c. Suggested wording for fire and smoke barriers: "FIRE AND SMOKE BARRIER - PROTECT ALL OPENINGS."

B. Through-penetration firestop systems and devices:

1. Install at penetrations through fire-rated floor and wall construction, including partitions and floor/ceiling assemblies, in accord with manufacturer's product data and UL System Numbers. Provide materials and accessories as required.
2. Install intumescent type firestop systems where plastic piping, cable, conduit and other combustible items, including insulated metal pipes, penetrate fire-rated construction.
3. At Contractor's option, through-penetration firestop devices of similar function may be installed in lieu of firestop systems.
4. Do not remove forming materials unless specified in system designs.

C. Firestop sealant: Seal perimeters, voids and joints of fire-rated walls and partitions, including abutment of floor and roof or ceiling structure, and flutes of metal decking. If required by UL Design, install mineral wool or ceramic fiber in cavities, packed full and tight with allowance for sealant installation. Seal both faces of walls and partitions with firestop sealant. Tool sealant flush with adjacent finish. In accord with UL Fire Resistance Directory Designs, packed concrete and masonry joints shall be sealed using firestop sealant or using sealant as specified in Joint Sealants section.

D. Mineral fiber safing:

1. Install safing in cavities of penetrations through non-rated floor and wall construction, including spaces around piping, conduits, cables and duct penetrations.

2. Install safing in voids and joints of non-rated walls and partitions abutting metal decking of floor and roof structures. Pack flutes of metal decking solid with safing material.
 3. Safing shall be installed at joints and penetrations in non-rated construction not exposed to view and concealed in finish work. Secure safing by compressing into voids or joints and using manufacturer's standard clips or closure plates as required.
- E. Seal voids and joints of non-rated walls and partitions abutting concrete floor and roof construction using sealant as specified in other sections.

End of Section

SECTION 07 9200

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY:

- A. Related work specified elsewhere:
 - 1. Window framing internal sealants.
 - 2. Glazing sealants.
 - 3. Roofing and flashing sealants.
 - 4. Firestopping.

- B. Definitions:
 - 1. Sealant: A weatherproof elastomer used in filling and sealing joints, having properties of adhesion, cohesion, extensibility under tension, compressibility and recovery; designed to make joints air and watertight. Material is designed generally for application in exterior joints and for joints subject to movement.
 - 2. Caulking compound: A material used in filling joints and seams, having properties of adhesion and cohesion; not required to have extensibility and recovery properties, generally for application in interior joints not subject to movement.
 - 3. Caulk: The process of filling joints, without regard to type of material.
 - 4. Joint failure: A caulked joint exhibiting one or more of the following characteristics:
 - a. Air and/or water leakage.
 - b. Migration and/or reversion.
 - c. Loss of adhesion.
 - d. Loss of cohesion.
 - e. Failure to cure.
 - f. Discoloration.
 - g. Staining of adjacent work.
 - h. Development of bubbles, air pockets or voids.

1.2 PERFORMANCE REQUIREMENTS:

- A. VOC content of interior sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Architectural Sealants: Not more than 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: Not more than 250 g/L.
 - 3. Sealant Primers for Porous Substrates: Not more than 775 g/L.

1.3 SUBMITTALS:

- A. Product data: Submit manufacturer's product description, indicating conformance with specified requirements and installation instructions for each type of sealant. Indicate preparation and priming requirements for each substrate condition.

- B. Color samples:
 - 1. Samples shall be actual materials or literature depicting actual colors of standard color materials. Architect reserves the right to reject work not in conformance with selected colors, based upon samples submitted.
 - 2. Submit samples of manufacturer's standard material colors for standard color sealants.
- C. Adhesion compatibility test results: Submit a letter from sealant manufacturer indicating adhesion and compatibility testing has been performed and that materials are compatible and that adhesion is acceptable. Indicate requirements for primers or special preparation.
- D. Substrate staining test results: Submit a letter from sealant manufacturer indicating that substrate stain testing has been performed on actual samples of substrates indicated to receive joint sealant and that sealant was found to be non-staining to substrate. Indicate requirements for primers or special preparation to meet non-staining requirements.

1.4 QUALITY ASSURANCE:

- A. Applicable standards as referenced herein:
 - 1. ASTM International (ASTM).
 - 2. Food and Drug Administration (FDA).
- B. Adhesion compatibility tests: Perform tests on actual samples of aluminum framing systems, EIFS, precast architectural concrete and masonry components, to determine that materials are compatible and that adhesion is acceptable. Identify requirements for primers or special preparation.
 - 1. Test structural sealants in accord with ASTM C1135-00(2005).
 - 2. Test sealants used in conjunction with EIFS in accord with ASTM C1382-05.

1.5 PROJECT/SITE CONDITIONS:

- A. Weather conditions:
 - 1. Install no materials under adverse weather conditions or when temperatures are below or above those recommended by manufacturer's product data or when substrate moisture content is above manufacturer's recommended level.
 - 2. Proceed with work only when forecasted weather conditions are favorable for joint cure and development of high early bond strength.
 - 3. Wherever joint width is affected by ambient temperature variations, install materials only when temperatures are in lower third of manufacturer's recommended installation temperature range.

- B. Protection of adjacent surfaces:
 - 1. Protect by applying masking material or manipulating application equipment to keep materials in joint. If masking materials are used, allow no tape to touch cleaned surfaces to receive sealant. Remove tape immediately after caulking, before surface skin begins to form.
 - 2. Remove misapplied materials from surfaces by using solvents and methods recommended by manufacturer.
 - 3. At surfaces from which materials have been removed, restore to original condition and appearance.

1.6 WARRANTIES:

- A. Installer's warranty: Warrant work to be watertight and free from defects in materials and workmanship, including joint failure, for a period of five years. Form of warranty shall be as included in Division 00.
- B. Exterior silicone sealant material warranty: Warrant exterior silicone sealants to be free from defects in materials and to provide structural adhesion, watertight weatherseal and non-staining of adjacent materials for a period of twenty years.
- C. Warranties shall begin at Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LOW MODULUS SILICONE SEALANT:

- A. Acceptable products; subject to compliance with specified requirements:
 - 1. Dow Corning Corp., #790.
 - 2. Pecora Corp., #890.
 - 3. Tremco, Inc., an RPM Company, SpecTrem 1.
- B. Characteristics:
 - 1. Type: One-part, low modulus silicone rubber; meeting ASTM C920-05, Type S, Grade NS, Class 25.
 - 2. Colors: Standard colors as selected by Architect.

2.2 MEDIUM MODULUS SILICONE SEALANT:

- A. Acceptable products; subject to compliance with specified requirements:
 - 1. Dow Corning Corp., #795.
 - 2. Pecora Corp., #895.
 - 3. Tremco, Inc., an RPM Company, SpecTrem 2.
- B. Characteristics:
 - 1. Type: One-part silicone rubber; meeting ASTM C920-05, Type S, Grade NS, Class 25.
 - 2. Colors: Standard colors as selected by Architect.

2.3 SILICONE BATH SEALANT FOR WET AREAS:

- A. Acceptable products:
 - 1. Dow Corning Corp., 786 Mildew-Resistant Silicone Sealant.
 - 2. General Electric Co., Silicone Products Dept., Sanitary 1700 Silicone Sealant.
 - 3. Pecora Corp., #898 Silicone Sanitary Sealant.
- B. Characteristics:
 - 1. Type: One-part silicone rubber, mildew- and stain-resistant.
 - 2. Color: Standard colors selected by Architect.

2.4 TWO-PART POLYURETHANE SEALANT FOR HORIZONTAL TRAFFIC-BEARING PAVEMENTS:

- A. Acceptable products:
 - 1. BASF Building Systems, Sonolastic SL-2.
 - 2. Pecora Corp., Urexpan NR-200.
 - 3. Tremco, Inc., an RPM Company, Vulkem 245/255.
 - 4. Tremco, Inc., an RPM Company, THC-900/THC-901.
- B. Characteristics:
 - 1. Type: Two-component polyurethane sealant for horizontal traffic-bearing surfaces meeting ASTM C920-05, Type M, Grade P or NS, Class 25; self-leveling for flat surfaces and non-sag for sloped surfaces.
 - 2. Colors: Standard colors as selected by Architect.

2.5 ACRYLIC SEALANT:

- A. Acceptable products:
 - 1. Bostik, Chem-Calk 600.
 - 2. Tremco, Inc., an RPM Company, Mono 555.
- B. Characteristics:
 - 1. Type: One-part, acrylic polymer sealant.
 - 2. Colors: Standard colors as selected by Architect.

2.6 PAINTABLE ACRYLIC-LATEX CAULKING COMPOUND:

- A. Acceptable products:
 - 1. BASF Building Systems, Sonolastic Sonolac.
 - 2. Bostik, Chem-Calk Painter's Calk.
 - 3. Pecora Corp., AC-20 Acrylic Latex.
 - 4. Tremco, Inc., an RPM Company, Tremflex 834.
- B. Characteristics: Flexible, paintable, non-staining, non-bleeding acrylic emulsion.

2.7 FDA APPROVED SEALANTS FOR KITCHEN AND FOOD SERVICE AREAS:

- A. Acceptable products:
 - 1. General Electric Company, Construction 1200 Silicone Sealant.
 - 2. Tremco, Inc., an RPM Company, Proglaze Silicone Construction Sealant.
 - 3. Pecora Corp., #863 Silicone.

- B. Characteristics:
 - 1. Type: One-part, moisture-curing silicone rubber; FDA Approved for use in indirect food contact areas.
 - 2. Color: Standard colors as selected by Architect, approved by FDA.

2.8 ACCESSORY MATERIALS:

- A. Joint cleaner: Type recommended by material manufacturer for substrates indicated.
- B. Joint primer/sealer: Type recommended by material manufacturer for substrates, conditions and exposures indicated.
- C. Bond breaker tape: Plastic tape applied to contact surfaces where bond to substrate or joint filler must be avoided for material performance.
- D. Sealant backer rod: Compressible rod stock as recommended by sealant manufacturer for compatibility with sealant. Provide size and shape of rod to control joint depth.
- E. Tooling agent: Agent recommended by material manufacturer to ensure contact of material with inner joint faces.

PART 3 - EXECUTION

3.1 JOB MOCK-UP:

- A. Prepare, caulk and finish one mock-up sample of each joint condition.
- B. Sample joints shall be approved by Architect prior to beginning work. Approved, undamaged mock-up joints shall serve as a standard of quality for the remainder of the work.

3.2 JOINT SURFACE PREPARATION:

- A. Clean joints of debris and projections including shims.
- B. Clean joint surfaces immediately before caulking joints. Remove dirt, insecure coatings, moisture and other substances which would interfere with bond.
- C. Etch concrete and masonry joint surfaces to remove excess alkalinity, unless material manufacturer's product data indicates that alkalinity does not interfere with bond and performance. Etch with 5% solution of muriatic acid; neutralize with dilute ammonia solution; rinse with clean water and allow to dry before caulking.
- D. Roughen joint surfaces of non-porous materials, unless material manufacturer's product data indicates equal bond strength as porous surfaces. Rub with fine abrasive cloth or wool to produce dull sheen.

3.3 APPLICATION:

- A. Comply with caulking material manufacturer's product data and ASTM C1193-05a except where more stringent requirements are specified.
- B. Prime joint surfaces where recommended by material manufacturer. Do not allow primer/sealer to spill or migrate onto adjacent surfaces.
- C. Install backer rod for caulking materials, except where recommended by material manufacturer to be omitted for application indicated.
 - 1. Place backer rod to maintain recommended sealant thickness and profile.
 - 2. Place rod at depth to provide sealant manufacturer's recommended sealant depth.
 - 3. Do not twist rod during installation.
 - 4. Place rod to minimize possibility of extrusion when joint is compressed.
 - 5. Install bond breaker tape in lieu of backer rod for shallow, closed joints and as recommended by manufacturer's product data.
- D. Employ installation techniques which will ensure that materials are deposited in uniform, continuous ribbons without gaps or air pockets, with complete wetting of joint bond surfaces. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form slight cove so that joint will not trap moisture and debris.
- E. Do not allow materials to overflow onto adjacent surfaces. Prevent staining of adjacent surfaces.
- F. Remove excess and misplaced materials as work progresses. Clean the adjoining surfaces to remove misplaced materials, without damage to adjacent surfaces or finishes.
- G. Interior joints: At interior joints and seams at abutting and adjacent materials, recess caulking compound 3/16" in joints wider than 1/4". At joints 1/4" or less in width, tool caulking flush.
- H. Tool joints of non-sag sealant to concave profile and smooth, uniform surface, flush with edges of substrate. Maintain sealant depth-to-width ratio in accord with manufacturer's product data.
- I. Cure sealants and caulking compounds in accord with manufacturer's product data to obtain high early bond strength, internal cohesive strength and surface durability. Protect uncured surfaces from contamination and physical damage.

3.4 CAULKING SCHEDULE:

- A. Exterior vertical expansion joints: Low modulus silicone sealant.

- B. Exterior and interior joints between precast concrete units, including false joints: Low modulus silicone sealant.
- C. Exterior and interior joints in masonry, including control joints: Low modulus silicone sealant.
- D. Joints between metal panels: Medium modulus silicone sealant.
- E. Joints in conjunction with exterior insulation and finish system (EIFS):
 - 1. EIFS/metal framing and other EIFS/non-porous substrate conditions: Medium modulus silicone sealant.
 - 2. All other conditions: Low modulus silicone sealant.
- F. Exterior and interior joints at perimeter of aluminum framing systems: Medium modulus silicone sealant.
- G. Exterior and interior joints at perimeter of hollow metal framing: Medium modulus silicone sealant.
- H. Exterior joints between wall finish and conduit and pipe penetrations, base plates of light fixtures, signage supports, and other items applied to exterior wall surface: Medium modulus silicone sealant.
- I. Interior concealed bedding joints and thresholds: Acrylic sealant.
- J. Exterior and interior horizontal traffic-bearing joints, excluding tile floor joints: Two-part polyurethane sealant.
- L. Tile and stone expansion and control joint sealant: Refer to Tiling section.
- M. Firestopped joints: Firestop sealant as specified in Firestopping section.
- N. Typical interior joints and seams at abutting and adjacent materials except as specified herein: Acrylic-latex caulking compound.
- O. Interior joints in conjunction with vanities, fixtures and tile finishes: Silicone bath sealant.
- P. Interior joints and seams at abutting and adjacent materials in food service areas, including joints around kitchen equipment: FDA Approved Sealant.

End of Section

SECTION 08 1100

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY:

- A. Related work specified elsewhere:
 - 1. Wood doors.
 - 2. Door hardware.
 - 3. Glazing.
 - 4. Painting and coating.

1.2 SUBMITTALS:

- A. Shop drawings: Indicate door and frame elevations and sections, materials, gauges and finishes, fabrication and erection details, location of finish hardware by dimension and locations, details of openings and louvers, and fire rating requirements.
- B. Samples: Submit as follows:
 - 1. Door: 1'-0" by 1'-0" corner section showing door construction.
 - 2. Welded frame: 1'-0" by 1'-0" head and jamb corner section showing welded corner construction.
 - 3. Knockdown frame: 1'-0" lengths of head and jamb members, with mitered corner construction.
 - 4. Anchors: One of each type.
- C. Product data: Indicate that hollow metal doors and frames comply with specified requirements, including performance criteria.
- D. Certification of label construction: For components exceeding Underwriters Laboratories Inc. (UL) tested size limitations, submit UL inspection certificate stating that component construction conforms to UL rating requirements.

1.3 QUALITY ASSURANCE:

- A. Applicable standards; standards of the following, as referenced herein:
 - 1. American National Standards Institute, Inc. (ANSI).
 - 2. ASTM International (ASTM).
 - 3. Steel Door Institute (SDI).
 - 4. National Fire Protection Association (NFPA), National Fire Codes.
 - 5. Underwriters Laboratories, Inc. (UL).
- B. Fire door assemblies:
 - 1. Door and frame assemblies in rated walls shall have been tested in accord with NFPA 252 or UL 10C; after 5 minutes into NFPA 252 test, neutral pressure shall have been established at 40" or less above sill.

2. Door and frame assemblies in corridors and smoke barriers shall have a minimum fire rating of 20 minutes and shall have been tested in accord with NFPA 252 or UL 10C without hose stream test. Assemblies shall comply with UL 1784 for draft and smoke control test; leakage may not exceed 3.0 CFM per foot of door at 0.10" of water column.

C. Labeling requirements:

1. Fire-rated components shall bear factory-applied labels showing name of manufacturer, name of third-party inspection agency, fire-protection rating, and where required for doors in exit enclosures, maximum transmitted temperature end point.
2. Smoke and draft doors complying with UL 1784 shall be labeled as a smoke and draft control door.
3. Permanently attach label to hinge stile of each fire-rated and smoke and draft control door.

D. Performance criteria:

1. Physical endurance: Comply with performance level for specified level classification in accord with ANSI A250.8-2003 and ANSI A250.4-01 for doors and hardware reinforcing, ANSI A250.4-01 for doors, frames, frame anchors and hardware reinforcing.
2. Finish: Comply with standard performance criteria of ANSI A250.10-98 for primed steel surfaces.
3. Thermal performance: Minimum aged value of $U = 0.10$ ($R = 10.2$) or better, apparent thermal performance in accord with SDI-113-01.
4. Acoustical performance: STC of 25 or better in accord with SDI-128-97, ASTM E90-04 and ASTM E413-04.

1.4 DELIVERY, STORAGE AND HANDLING:

- A. Deliver hollow metal doors and frames cartoned for protection. Mark each hollow metal door and frame at top hinge and on outside of carton with destination door mark indicated on door schedule.
- B. Inspect work upon delivery for damage. Reject damaged items.
- C. Store materials under cover, on raised platforms.
 1. Stack a maximum of five assembled frame units and doors vertically with minimum 1/4" spacers between units.
 2. Stack knocked down frames horizontally with minimum 1/4" spacers between frame units.
 3. Protect from moisture but provide for cross ventilation. Remove units from wet containers if wetting occurs.

PART 2 - PRODUCTS

2.1 DOORS AND FRAMES:

- A. Fabrication standard: Except for more stringent requirements specified, comply with ANSI A250.8-2003 including performance levels as referenced.
- B. Steel:
 - 1. Interior doors and frames: Fabricate of cold-rolled steel sheet meeting ASTM A1008-07.
 - 2. Exterior doors and frames: Fabricate of commercial quality, hot dip galvanized or galvanized steel sheet meeting ASTM A653-06a Designation A60 or G60; wipe coat not acceptable.
- C. Finish: Prime painted steel surfaces shall comply with requirements for acceptance stated in ANSI A250.3-1999.
 - 1. Interior doors and frames: One coat of manufacturer's standard rust-inhibitive primer.
 - 2. Exterior doors and frames: One coat of manufacturer's standard rust-inhibitive primer after chemical treatment of galvanized surfaces for paint adhesion.
- D. Door classification:
 - 1. Standard interior hollow metal doors: Level II, 18 ga. Heavy Duty, Model Two seamless, 1-3/4" thickness.
 - 2. Label fire-resistive composite metal doors: Level II, 18 ga., Heavy Duty, Model Two seamless, 1-3/4" thickness, with mineral fiberboard core for all ratings over 20 minutes.
 - 3. Exterior insulated composite metal doors: Level II, 18 ga., Heavy Duty, Model Two seamless, 1-3/4" thickness, with polyurethane core.
- E. Door characteristics:
 - 1. Edge bevel: Vertical edges beveled 1/8" in 2"; double-acting doors rounded on 2-1/8" radius. Non-handed door blanks with filler plates are not acceptable.
 - 2. Top and bottom edges: Flush, welded, minimum 18 ga. steel. Provide weep holes in bottom edge of exterior doors.
 - 3. Join edges of exterior doors by a continuous weld extending the full height of door. Grind, fill and dress welds smooth to make invisible and provide smooth flush surface.
 - 4. Join door edges of interior doors by tack welds no more than 6" on center extending the full height of door. Grind, fill and dress tack welds smooth to make them invisible and provide a smooth flush surface.
 - 5. Astragals: Mortised, 12 ga. material. Fire-rated "B" and "C" labeled doors shall be of type not requiring astragals to obtain rating.
 - 6. Glass moldings and stops:
 - a. Where specified or scheduled, provide doors with hollow metal moldings to secure glazing by others in accordance with glass opening sizes shown on approved shop drawings.
 - b. Weld fixed moldings to door on security side.

- c. Loose stops shall be not less than 20 gage, with mitered corner joints, secured to frame opening by cadmium- or zinc-coated countersunk screws at 1'-0" o.c. maximum.
 - d. Design snap-in moldings with mitered corners and with a non-removable stop on security side after glass installation.
- F. Frame construction including sidelights and borrowed lite frames:
- 1. Welded steel frames in masonry and concrete walls, fire-rated frames and frames over 7'-0" in height in drywall partitions: 16 ga., with backbend returns.
 - a. Setup arc welded, with all joints, including face, flange and throat, full welded, dressed and ground smooth; no mechanical interlocking allowed.
 - b. Provide welded frames with temporary spreaders during shipping, storage and erection. Spreaders shall span both rabbets of frame and be located at bottom and at middle of frame.
 - 2. Knockdown steel frames in drywall partitions, except fire-rated frames and frames over 7'-0" in height: 16 ga. knockdown (mitered) type with mitered, reinforced, interlocking head and jamb members and backbend returns.
 - 3. Machine door frames for hardware scheduled for installation on that frame. Filler plates installed at unused openings will not be acceptable.
 - 4. Joints:
 - a. Dress welded joints and ground smooth, indistinguishable in completed work.
 - b. Make non-welded connections with tight fitting, closed joints.
 - c. Make joints with aligned faces and arrises.
 - 5. Loose glazing stops:
 - a. Removable glazing stops shall be cold rolled steel, no less than 20 gage, butted at corner joints and secured to frame using cadmium or zinc plated #6 countersunk sheet metal screws at 1'-0" o.c. maximum.
 - b. Frame underneath glazing stops and the inside of glazing stop shall be treated for maximum paint adhesion and painted with a rust inhibitive primer prior to installation in the frame.
- G. Panels: Same construction as doors, attached with concealed fasteners.
- H. Frame anchors:
- 1. Wall anchors for frame attachment to masonry construction: Adjustable, flat, minimum 18 gage corrugated or perforated, T-shaped steel anchors with leg not less than 2" wide by 10" long. Provide one anchor per jamb for each 2'-0" of height or fraction thereof. Anchors for fire-rated frames shall be labeled type.

2. Wall anchors for frame attachment to drywall partitions: Manufacturer's standard adjustable type for attachment to studs. Provide one anchor per jamb for each 2'-0" of height or fraction thereof. Anchors for fire-rated frames shall be labeled type.
 3. Frame anchors for drywall slip-on frames: Adjustable jamb and base anchors, manufacturer's standard design. Anchors for fire-rated frames shall be labeled type.
 4. Floor anchors: Provide frames, other than slip-on drywall type, with minimum 18 gage anchors for attachment to floor.
 - a. For wall conditions that do not allow for the use of a floor anchor, provide an additional jamb anchor.
 - b. Anchors for fire-rated frames shall be labeled type.
 5. Head struts: For frames over 7'-0" high and not anchored to masonry or concrete construction, provide 1/4" by 2" steel struts spot welded to jambs, each side, extending to building structure. Attach to structure. For frames over 4'-0" in width, provide center strut at head.
- I. Bituminous coating for inside of fully grouted frames: Cold-applied, asphalt mastic meeting SSPC-Paint 12-82, minimum 30 mils thickness. Comply with coating requirements of ANSI A250.11-01.
- J. Preparation for hardware and anchors:
1. Reinforcement: Reinforce components for hardware installation in accord with ANSI A250.8-2003.
 2. Punch single leaf frames to receive three silencers; double leaf frames to receive two silencers per leaf, at head.
 3. Factory-prepared hardware locations shall be in accord with ANSI A250.8-2003 and ANSI A250.6-2003.
 4. Provide grout shields where frames in masonry walls are cut or drilled.
 5. Install hardware reinforcement and anchors without distortions or blemishes on exposed surfaces.

PART 3 - EXECUTION

3.1 FRAME INSTALLATION:

- A. General:
1. Install hollow metal frames in accord with ANSI A250.8-2003, ANSI A250:11-2001, SDI-122-07, manufacturer's product data and approved shop drawings.
 2. Frames in masonry and concrete walls and fire-rated frames shall be tightly butted to walls. For other frames, clearance between frame and interfacing wall surfaces shall be 1/16" maximum.
 3. Shimming of door hinges is not an acceptable correction of door frames installed out of erection tolerance.

- B. Welded frames:
1. Set welded frames in position prior to beginning partition work. Brace frames until permanent anchors are set.
 2. Set anchors for frames as work progresses. Install anchors at hinge and strike levels. Install rubber bumpers and silencers in frames prior to grouting. Grout frames in masonry walls as specified in Concrete Unit Masonry section.
 3. Remove temporary braces and spreaders after wall construction is complete.
 4. Install welded frames in prepared openings in concrete and masonry walls using countersunk bolts and expansion shields.
 5. Weld field splices in borrowed lite frames and grind smooth.
- C. Knockdown frames: Install in accord with approved shop drawings. Secure using adjustable jamb and base anchors. Complete installation shall have tight-fitting joints, without gaps or offsets.
- D. Fire-rated frames: Install in accord with requirements of NFPA No. 80 and ANSI A250.11-2001.

3.2 DOOR INSTALLATION:

- A. General:
1. Install doors in accord with SDI-122-07, ANSI A250.8-2003, manufacturer's product data and approved shop drawings.
 2. Seal tops of exterior, out-swinging doors prior to painting. Paint bottoms of doors in accord with Painting and Coating section prior to hanging doors.
 3. Install hollow metal doors in frames, using hardware specified in Door Hardware section.
 4. Shimming of door hinges is not an acceptable repair of warped doors or door frames out of erection tolerances.
- B. Edge clearances at doors:
1. Between door and frame, at head and jambs: 1/8".
 2. At meeting edges of pairs of doors and at mullions: 1/8" to 1/4" (1/8" for fire rated doors).
 3. At sills without thresholds: 3/8" maximum above finish floor.
 4. At sills with thresholds: 3/8" maximum above top of threshold.
 5. Between face of door and door stop: 1/16".
- C. Fire-rated doors: Install in accord with requirements of NFPA No. 80, SDI-118-2002 and ANSI A250.11-2001.

3.3 SITE TOLERANCES:

- A. Allowable erection tolerances:
1. Variation from specified clearances: +1/32".
 2. Variation in face alignment, pairs of doors: +1/16".
 3. Variation in face alignment between door and frame: 1/8" maximum.

3.4 CLEANING AND PROTECTION:

- A. Protect hollow metal doors and frames from damage and staining until Date of Substantial Completion. Replace or repair damaged or stained components.
- B. Replace components which exhibit warp, buckle or broken welds.

End of Section

SECTION 08 1400

WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY:

- A. Related work specified elsewhere:
 - 1. Finish carpentry.
 - 2. Architectural woodwork.
 - 3. Metal door frames.
 - 4. Door hardware.
 - 5. Glazing.

1.2 SUBMITTALS:

- A. Product data: Submit manufacturer's product description, indicating materials, classifications, factory finish and fabrication. Include manufacturer's proposed warranty. Indicate that doors meet specified requirements, including fire ratings. Include manufacturer's requirements for door installation, finishing, care, maintenance and cleaning to obtain specified warranties.
- B. Shop drawings: Submit schedules and elevations indicating door sizes, construction, swing, fire rating, undercut, and hardware locations. Dimension and detail openings for glass lites. Indicate that doors meet specified requirements, including fire ratings.
- C. Samples:
 - 1. Submit 4" by 4" door corner samples indicating construction for each door type.
 - 2. Submit a minimum of 3 samples of each face veneer, 2'-0" by 2'-0" in size, representative of proposed species, cut, color and grain, with proposed factory finish. Accepted samples shall indicate extremes of color, graining, defects and general quality of proposed veneers.
- D. Intent to warrant and certifications: Submit an Intent to Warrant executed by authorized representative of door manufacturer, indicating that manufacturer has reviewed drawings and specifications, conditions affecting the work and the relationship of doors with related work, and that manufacturer proposes to provide warranties as referenced herein without further stipulation.

1.3 QUALITY ASSURANCE:

- A. Allowable color and grain variation of natural finished doors: Color and grain shall be uniform and within range established by accepted veneer samples as specified herein. Joints in face veneers shall be inconspicuous. Adjacent doors and doors viewed together shall have similar color and grain.

- B. Fire door assemblies:
 - 1. Door assemblies in rated walls shall have been tested in accord with NFPA 252 or UL 10C.
 - 2. Door assemblies in corridors and smoke barriers shall have a minimum fire rating of 20 minutes and shall have been tested in accord with NFPA 252 or UL 10C without hose stream test. Assemblies shall comply with UL 1784 for draft and smoke control test; leakage may not exceed 3.0 CFM per foot of door at 0.10" of water column.
 - 3. Fire-rated doors shall provide rating without use of salt-treated wood, or manufacturer shall provide certification that treated wood is non-hygroscopic and shall warrant door against failure or discoloration of face veneer and door finish.
- C. Labeling requirements:
 - 1. On top edge, provide each door with a label which identifies manufacturer, trade association of which he is a member, grade and type of door or industry standard with which it complies.
 - 2. Fire-rated components shall bear factory-applied labels showing manufacturer's name, name of third-party inspection agency, fire-protection rating, and where required for doors in exit enclosures, maximum transmitted temperature end point. Permanently attach label to hinge stile of each fire-rated door.
 - 3. Smoke and draft doors complying with UL 1784 shall be labeled as a smoke and draft control door.
- D. All flush doors shall be the product of one manufacturer.
- E. Face veneers shall be domestically assembled veneer facing using no rainforest-produced crossbands or backs.
- F. Applicable standards; as referenced herein:
 - 1. American National Standards Institute (ANSI).
 - 2. ASTM International (ASTM).
 - 3. Architectural Woodwork Institute (AWI), "Architectural Woodwork Quality Standards", 2005, herein referred to as AWI Standards.
 - 4. Hardwood Plywood and Veneer Association (HPVA).
 - 5. National Fire Protection Association (NFPA).
 - 6. Underwriters Laboratories, Inc., (UL).
 - 7. Warnock-Hersey (WH).
 - 8. Window and Door Manufacturer's Association (WDMA).

1.4 DELIVERY, STORAGE AND HANDLING:

- A. Deliver no doors to building until weatherproof storage space is available. Store doors in a space having controlled temperature and humidity. Stack doors flat, off floor, supported to prevent warpage and protected from damage and direct exposure to sunlight.
- B. Seal top and bottom edges of doors, if required by manufacturer's product data to maintain warranty.

- C. Protect doors during shipping and storage by enclosing in polyethylene bags. Replace doors in original packaging for shipment to site following machining and finishing. Hang pre-machined and prefinished doors without removal of packaging. Identify each door with door number on packaging. Maintain packaging in place until Date of Substantial Completion.
- D. Break packaging seal on site to permit ventilation.
- E. Do not walk or stack other materials on top of stacked doors. Do not drag doors across each other.

1.5 WARRANTIES:

- A. Provide manufacturer's door replacement warranty against warpage, twist, delamination, telegraphing of core and manufacturing defects for the following terms:
 - 1. Interior solid core and mineral core doors: Lifetime of original installation.
 - 2. Door finish for rated doors: Five years against discoloration or failure of factory finish of fire-rated mineral core doors with salt-treated wood components.

PART 2 - PRODUCTS

2.1 FLUSH DOORS:

- A. Acceptable manufacturers; subject to compliance with specified requirements:
 - 1. Algoma Hardwoods, Inc.
 - 2. Eggers Industries, Inc.
 - 3. Marshfield DoorSystems, Inc.
 - 4. Oshkosh Architectural Door Co.
- B. General quality standard: WDMA I. S. 1-A or AWI, Section 1300, Custom Grade.
- C. Glued particleboard core wood doors:
 - 1. Description: Meeting AWI Standards, Section 1300, five-ply veneer face construction, AWI PC5, particleboard core.
 - a. Thickness: 1-3/4".
 - b. Adhesive bond:
 - 1) Type II or better.
 - 2) Adhesives shall not contain urea formaldehyde.
 - c. Blocking: Top and bottom rail and lock stile blocking shall accommodate specified hardware, without through-bolting hardware.
 - 2. Core: Single-piece particleboard meeting ANSI A208.1, Grade LD-1 or LD-2, DPC-1.
 - a. Particleboard: ANSI A208.1, Grade LD-2, made with binder containing no urea-formaldehyde resin.
 - 3. Construction: Hardwood stiles and rails glued to core; core assembly sanded for uniform thickness.

4. Crossbanding: Engineered high density fiberboard (HDF), minimum 1/16" thickness.
 5. Fire resistance rating: Comply with specified requirements for tested, labeled door construction for ratings indicated on drawings.
- C. Fire-rated mineral core doors:
1. Description: Five-ply non-combustible mineral composition core construction, meeting AWI Standards, Section 1300, FD Series and label requirements scheduled on drawings.
 - a. Thickness: 1-3/4".
 - b. Adhesive bond: Type I, containing no urea formaldehyde.
 2. Core: Single piece, non-combustible, asbestos-free, mineral composite with minimum 24 pcf density when tested in accord with ASTM C303-07, with 10 percent maximum moisture absorption by weight with core in equilibrium at 90 percent relative humidity and 70° F.
 3. Construction: Stiles, rails and blocking glued to core; core assembly sanded for uniform thickness. Reinforced composition laminate stile backers, rails and blocking, to receive full mortise hinge installation, with the following minimum characteristics:
 - a. Screw withdrawal resistance: 600 lbs. minimum when tested in accord with ASTM D1037-06a.
 - b. Split resistance: 750 lbs. average when tested in accord with ASTM D143-94(2007).
 - c. Blocking: Top and bottom rail and lock stile blocking to accommodate specified hardware, meeting label requirements scheduled.
 4. Crossbanding: Engineered high density fiberboard (HDF), minimum 1/16" thickness. Crossbanding shall be non-salt-treated or door finish shall be warranted by door manufacturer against failure or discoloration.
 5. Fire resistance rating: Comply with specified requirements for tested, labeled door construction for ratings indicated on drawings.
 6. Where rated door pairs require metal astragal for labeled construction, astragals shall be wrapped in veneer matching door face or concealed within door edge.
- D. Facing veneer for transparent finish:
1. Veneer species: Select White Birch.
 2. Veneer slicing: Rotary sliced panels with sequence matched veneers center matched across door width.
 3. Face of door veneer matching: Book matched, center matched across width.
 4. For pairs of doors and doors adjacent to other doors, provide balance matched assembly.
 5. Veneer thickness: Minimum 1/52" after sanding at 12% moisture content.
 6. Adhesive bond: Type I, containing no urea formaldehyde.
 7. Quality grade: A veneers.

E. Vertical stiles:

1. Stiles for transparent finish doors not requiring fire ratings: Minimum 1-3/8" wide by thickness of core with specified veneer, solid hardwood or structural composite lumber inner stile backer with edge veneer matching face veneer in specie, color and graining; no exposed fingerjoints allowed.
2. Stiles for fire-rated doors: Minimum 1-3/8" wide by thickness of core with specified veneer, solid hardwood or lamination meeting fire rating requirements; edge veneer matching face veneer.
 - a. 20-minute rated pairs without metal edges or astragals: As required by manufacturer to permit positive pressure "S" label per Category H; veneer banded to match face veneer over manufacturer's edge for improved screw holding.
 - b. Mineral core doors required to meet positive pressure Category A (concealed) requirements: As required by door manufacturer.
 - c. Pairs of fire-rated doors:
 - 1) With metal edges or metal edges and astragals: As required by door manufacturer's test data for required fire-ratings, wrapped with veneer matching face in specie, color and graining.
 - 2) Without metal edges or metal edges and astragals: As required by door manufacturer's test data for required fire-ratings.
 - 3) For 20 minute doors: Treated stiles at meeting edge.
 - 4) Mineral core doors required to meet positive pressure Category A (concealed) requirements: As required by door manufacturer.

F. Rails: Mill option hardwood or structural composite lumber and as required to meet positive pressure ratings.

G. Moldings and trim:

1. Furnish in same species as hardwood matching grain and color of face veneer for transparent finish, no fingerjoints allowed.
2. Moldings for solid core doors: Flush style with mitered corner joints.
3. Moldings for fire-rated doors: Manufacturer's standard matching solid hardwood, laminated wood or primed steel edge meeting fire-rating requirements. Wrap steel edge with veneer matching veneer face in specie, color and graining.
4. Provide moldings for glass lites.

2.2 GLAZING:

A. Refer to Glazing section for tempered glazing.

2.3 FACTORY FITTING, MACHINING AND FINISHING:

- A. Factory fitting and machining are required for all wood doors. Factory finishing is required for all transparent finished doors.
- B. Fitting and machining:
 - 1. Factory fit and machine doors to clearances and bevels specified.
 - 2. Prepare for hardware installation using hardware manufacturer's templates.
 - a. Locate in accord with WDMA I. S. 1.7, unless otherwise indicated.
 - b. Drill pilot holes for screws and bolts.
 - 3. Seal edges of doors and cutouts immediately following fitting and machining.
- C. Openings:
 - 1. Cut openings to receive glass lites in accord with AWI requirements or WDMA I. S. 1-A.
 - 2. Seal edges of cutout immediately following cutting using one coat of solvent type sealer.
 - 3. Install glass lites without looseness or rattle. Trim shall have mitered corner joints and shall conceal edges of cutout and door core.
 - 4. Protect door faces from damage during cutting.
 - 5. Prepare and glaze openings in fire-rated doors in accord with NFPA and UL requirements.
- D. Clearances and bevel:
 - 1. Hinge stile: 1/8".
 - 2. Lock stile: 1/8".
 - 3. Top: 1/8".
 - 4. Bottom: 1/4" above floor finish or threshold, except where undercutting is indicated. Confirm installed floor covering thickness before cutting door bottom edges.
 - 5. Meeting stiles, pairs of doors: 1/8".
 - 6. Bevel: 1/8" in 2".
- E. Sanding: Factory sand doors to comply with AWI Standards, Section 1300.
- F. Factory finish:
 - 1. Type: AWI Standards, Section 1500, Custom Grade, System Conversion Varnish or Catalyzed Polyurethane, filled finish. Color and sheen shall match Architect's approved sample.
 - 2. Finish faces and edges of doors, including mortises and cutouts.

2.4 SOURCE QUALITY CONTROL:

- A. Fabrication tolerances:
 - 1. Overall dimension: $\pm 1/16$ ".
 - 2. Width: $+1/32$ ".
 - 3. Maximum warp, bow, cup or twist: 1/4".
 - 4. Squareness: Maximum 1/8" difference in diagonal measurement.
 - 5. Hardware locations: -0", $+1/32$ ".

PART 3 - EXECUTION

3.1 PRE-INSTALLATION MEETING:

- A. Pre-installation meeting: Prior to beginning door installation work, a pre-installation meeting shall be held to review work to be accomplished.
 - 1. Contractor, Architect, door manufacturer's representatives, and all other subcontractors who have equipment relating to doors shall be present.
 - 2. Contractor shall notify all parties at least seven days prior to time for meeting.
 - 3. Contractor shall record minutes of meeting and distribute to attending parties.

3.2 INSTALLATION:

- A. Acclimatization: Allow doors to become acclimated to finished space conditions a minimum of 72 hours before hanging.
- B. Field fitting and machining:
 - 1. Conform to AWI requirements for fit and clearance tolerances.
 - 2. Fit doors for width by planing equally from both stiles; for height by sawing not more than 1/4" from each top and bottom rail.
 - 3. Fit fire-rated doors for width by planing from lock stile only, with 3/16" maximum removed from edge; for height by sawing from bottom only, with 1" maximum removed from bottom rail, unless otherwise required by manufacturer's product data and label testing agency.
 - 4. Following cutting or planing, sand sharp corners and edges smooth. Bevel or ease vertical edges.
 - 5. Hardware preparation: Prepare doors to receive scheduled hardware using hardware manufacturer's templates. Locate hardware in accord with WDMA I. S. 1.7, unless otherwise indicated.
 - 6. Seal edges of doors and cutouts immediately following fitting and machining.
- C. Preparation: Verify that framed openings are installed within specified tolerances. Do not install doors in frames which are not installed within size and plumbness tolerances.
- D. Installation:
 - 1. Install doors in accord with manufacturer's product data using scheduled hardware. Install using threaded-to-the-head wood screws furnished by hardware manufacturer.
 - 2. Anchor hardware in correct position and alignment.
 - 3. Adjust hardware and door for proper function and for smooth, free operation, latching without force or excess clearance, within specified clearances and tolerances.
- E. Fire-rated doors: Install in accord with UL requirements and NFPA No. 80-92 and No. 105-93.

- F. Erection tolerances:
 - 1. Variation from specified clearances: $+1/32"$, -0 .
 - 2. Maximum variation in edge alignment, pairs of doors:
 $1/16"$.

- G. Replace doors with defects in material, finish, fit or machining.

End of Section

SECTION 08 3100

ACCESS DOORS AND PANELS

PART 1 - GENERAL

1.1 SUBMITTALS:

- A. Product data: Indicate material types, finishes and sizes, fabrication and installation details and requirements.

1.2 QUALITY ASSURANCE:

- A. Applicable standards; standards of the following, as referenced herein:
1. ASTM International (ASTM).
 2. National Fire Protection Association (NFPA), National Fire Codes.
- B. Labeling requirements:
1. Fire-rated access door assemblies shall bear factory-applied labels showing name of manufacturer, name of third-party inspection agency, fire-protection rating, and where required for access doors in exit enclosures, maximum transmitted temperature end point.
 2. Horizontal access doors shall bear a label that includes the wording "FOR HORIZONTAL INSTALLATION".
 3. Permanently attach label to each door and frame.

1.3 DELIVERY, STORAGE AND HANDLING:

- A. Deliver access doors in protective packaging.
- B. Store in packaging to prevent soiling and physical damage.
- C. Handle to prevent damage to finished surfaces and operating mechanisms.

1.4 PROJECT/SITE CONDITIONS:

- A. Protection: Protect prefinished surfaces from damage or staining. Following installation, provide protective covering for duration of project.
- B. Coordinate installation of access doors required to be built into building structure. Secure templates or lay out to rough dimensions provided by specialty manufacturer.

PART 2 - PRODUCTS

2.1 ACCESS DOORS AND PANELS:

- A. Acceptable manufacturers; subject to compliance with specified requirements:
1. J. L. Industries, Inc.
 2. Karp Associates, Inc.
 3. Wilkinson Co., Inc.
 4. Williams Brothers Corp.

- B. Characteristics:
1. Size: As indicated on drawings..
 2. Types:
 - a. Typical: As required by substrates.
 - b. Non-fire-rated access doors in gypsum board work:
Flush type with perforated frame flanges for finishing with joint compound.
 3. Construction:
 - a. Non-fire-rated units: Minimum 14 ga. steel sheet for doors; 16 ga. for frames; prime painted.
 - b. Fire-rated units: Minimum 22 ga. steel inside and outside faces; box construction, filled with insulation; 16 ga. frames; prime painted.
 4. Hardware:
 - a. Non-fire-rated units: Manufacturer's standard concealed hinges allowing 175 degree operation and cam lock.
 - b. Fire-rated panels: Manufacturer's standard continuous piano hinges, self-closing mechanism, interior release and cylinder lock. Provide two keys per lock.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install access doors in accord with manufacturer's product data, plumb, level and true to line and location.
- B. Install access doors with fasteners of type and spacing recommended by manufacturer's product data.
- C. Set fire rated access doors at locations and elevations indicated and in accord with NFPA 80.
- D. Protect surfaces from damage or staining. Clean surfaces prior to Date of Substantial Completion.
- E. Test and adjust hardware for ease of operation.

End of Section

SECTION 08 3313

COILING COUNTER DOORS

PART 1 - GENERAL

1.1 SUBMITTALS:

- A. Shop drawings; indicate the following:
 - 1. Locations and elevations of counter shutters.
 - 2. Guide details and method of anchorage to openings.
 - 3. Construction details.
 - 4. Configurations, locations and installation of hardware.
 - 5. Size, shape and thicknesses of materials.
 - 6. Fittings and other attachments, including installation of counterbalance.
- B. Product data: Submit manufacturer's installation and operation instructions.

1.2 QUALITY ASSURANCE:

- A. Applicable standards; standards of the following, as referenced herein.
 - 1. Aluminum Association (AA).
 - 2. ASTM International (ASTM).
- B. Fire shutter assemblies:
 - 1. Comply with requirements of NFPA 80, Standard for Fire Doors and Fire Windows.
 - 2. Shutter assemblies in rated walls shall have been tested in accord with NFPA 252 or UL 10B, with pressure in furnace equal to atmospheric.
 - 3. Shutter assemblies in corridors and smoke barriers shall have a minimum fire rating of 20 minutes and shall have been tested in accord with NFPA 252 or UL 10C without hose stream test. Assemblies shall comply with UL 1784 for draft and smoke control test; leakage may not exceed 3.0 CFM per foot of shutter at 0.10" of water column.

PART 2 - PRODUCTS

2.1 COILING ALUMINUM SHUTTERS:

- A. Acceptable manufacturers; subject to compliance with specified characteristics:
 - 1. Apton Metal Products Corp.
 - 2. The Cookson Co.
 - 3. Cornell Iron Works, Inc.
 - 4. Overhead Door Corp.
 - 5. Wayne-Dalton Corp.
- B. Curtain characteristics:
 - 1. Curtain construction: Fabricated of extruded interlocking slats with stainless steel or cadmium-plated steel endlocks and safety endlocks.

2. Slats: Minimum 0.050" thickness, 6063 aluminum alloy meeting ASTM B221-06, maximum 1-1/2" in width by full length; flat face design.
 3. Bottom bar: Manufacturer's standard tubular extruded aluminum design; housing locking mechanism and vinyl astragal.
- C. Hood: Minimum 0.040" thickness aluminum alloy, for face of wall mounting.
- D. Finish on exposed aluminum components: AA-A41, Class I, clear anodized finish.
1. Minimum coating weight: 32 mg./in.², tested in accord with ASTM B137-95(2004).
 2. Minimum coating thickness: 0.70 mils, tested in accord with ASTM B244-97(2002).
- E. Type of operation: Crank operation with removable crank.
- F. Hardware:
1. Guides: Minimum 0.125" thickness, 6063 aluminum alloy meeting ASTM B221-06, manufacturer's standard design complete with wool pile stripping to minimize noise. Design shall provide for concealment of fasteners.
 2. Brackets: Fabricated from steel plate, manufacturer's standard design.
 3. Counterbalance: Oil-tempered torsion spring in steel barrel housing across full width of opening. Maximum allowable deflection of shaft shall be 0.030"/ft. of opening. Counterbalance shall have minimum life expectancy of 100,000 full cycles.
 4. Removable crank: Manufacturer's standard design, complete with crank.
 5. Locking: Slide bolts at each jamb, with lock to receive mortise type cylinder specified in Door Hardware section. Lock housing and slide bolts shall be integral with bottom bar. Provide cylinder on inside at each jamb.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install coiling counter shutters in accord with approved shop drawings.
- B. Secure guides to walls, plumb, level and true to line. Anchor guides at spacings not to exceed 1'-6" o. c., unless otherwise indicated on approved shop drawings.
- C. Provide additional support, if required, for attachment of guides, brackets or hoods to interfacing surfaces.
- D. Connect and adjust operating hardware.

End of Section

SECTION 08 3323

OVERHEAD COILING STEEL DOORS

PART 1 - GENERAL

1.1 SUBMITTALS:

- A. Shop drawings; indicate the following:
 - 1. Locations, elevations and method of attachment.
 - 2. Guide details and method of anchorage to openings.
 - 3. Construction details.
 - 4. Configurations, locations and installation of hardware.
 - 5. Size, shape and thicknesses of materials.
 - 6. Details of tracks, rollers, fittings and other attachments, including installation of counterbalance, operators.
- B. Product data: Submit manufacturer's installation and operation instructions for electrically operated doors.

1.2 QUALITY ASSURANCE:

- A. Applicable standards; standards of the following, as referenced herein: ASTM International (ASTM).
- B. Wind load requirements: Completed door installation shall be designed to withstand a wind load of 20 psf.

PART 2 - PRODUCTS

2.1 COILING DOORS:

- A. Acceptable manufacturers; subject to compliance with specified requirements:
 - 1. Clopay Building Products Co.
 - 2. The Cookson Co.
 - 3. Cornell Iron Works.
 - 4. Overhead Door Corporation.
 - 5. Wayne-Dalton Corp.
- B. Curtain characteristics:
 - 1. Curtain construction: Fabricated of roll-formed, interlocking steel slats, endlocks and bottom bar. Provide endlocks on alternating slats, except as otherwise required by manufacturer, to meet wind load, opening width.
 - 2. Slats: Minimum 20 ga. hot dip galvanized steel, flat face design, full length slats without splices in total door width.
 - 3. Windlocks: Provide if required to meet wind load requirements.
 - 4. Bottom bar: Double reinforcing angle design. Provide sloping bottom bar, as required.
 - 5. Hood: Minimum 24 ga. hot dip galvanized steel for face of wall mounting.

6. Finish for curtain and hood: Hot dip galvanized in accord with ASTM A653-06a, Coating Designation G-90, phosphatized, finished with one coat of manufacturer's standard shop primer and manufacturer's standard baked enamel finish, standard color as selected by Architect.
- C. Type of operation:
1. Public Restrooms: Manual push-up.
 2. Loading dock: Power operator.
- D. Hardware:
1. Guides: Minimum 3/16" thickness, continuous steel angles of size indicated on approved shop drawings. Provide guides with removable, flush-mounted curtain stops of manufacturer's standard design.
 2. Brackets: Fabricated from steel plate, manufacturer's standard design.
 3. Gears: Cast iron, with teeth cast from machine-cut patterns.
 4. Counterbalance: Oil-tempered torsion spring in steel barrel housing across full width of opening. Maximum allowable deflection of shaft is 0.030"/ft. of opening. Counterbalance shall have a minimum life expectancy of 100,000 full cycles.
 5. Weatherstripping: Manufacturer's standard type compressible bottom rail weatherstrip, guide seal strips and hood baffle.
- E. Power operator: Factory pre-wired motor operator bearing UL label, of design and size recommended by door manufacturer to operate doors at minimum of 2/3 ft./sec.
1. Provide operator with gear reduction unit, solenoid-operated brake, clutch, control devices and wiring.
 2. Control stations:
 - a. Provide recessed, control stations located adjacent to door.
 - b. Provide key-operated station to receive standard mortise type cylinder specified in Door Hardware section, with contacts for "OPEN," "CLOSE" and "STOP."
 - c. Provide weatherproof exterior stations.
 - d. Provide control stations located on each side of each door.
 3. Emergency operator: Chain and gear type requiring maximum 35 lbs. pull to operate door.
 4. Automatic reversal: Equip doors with automatic reversal feature which re-opens door if obstruction is encountered during closing operation. Incorporate bottom rail weatherstripping in reversing edge.
 5. Equip power operator with self-locking gears.
- F. Locking: Provide electric interlocks to prevent door motor operation when lock bolts are engaged in guides. Manufacturer's standard locking device to receive standard mortise cylinders on exterior.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install coiling doors in accord with approved shop drawings and product data:
 - 1. Secure guides to walls, plumb, level and true to line. Anchor guides at spacings not to exceed 1'-6" o. c., unless otherwise indicated on approved shop drawings.
 - 2. Provide additional support, if required, for attachment of guides, brackets or other door or operator mechanisms to interfacing surfaces.
- B. Connect and adjust electrical components and operating hardware.
- C. Protect finished installations until Date of Substantial Completion. Repair damage to curtain, hardware and operators and adjust for proper operation.

End of Section

SECTION 08 4113

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 PERFORMANCE REQUIREMENTS:

- A. Design criteria; glazed storefront framing without doors or operable vents:
1. Design storefront and entrance framing systems to provide for such expansion and contraction of component materials as will be caused by a surface temperature ranging from -10°F. to 150°F. without causing buckling, stresses on glass, failure of joint seals, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or other detrimental effects. Operating windows and doors shall function normally over this temperature range.
 2. Structural performance:
 - a. Complete storefront and entrance framing system shall be designed to withstand wind loading complying with International Building Code, loads acting normal to wall plane. Test per ASTM E330-02, Procedure A.
 - b. Deflection of framing members in a direction normal to wall plane, when subjected to a uniform load deflection test at design pressures specified above, in accord with ASTM E330-02, Procedure A, shall not exceed 1/175 of its clear span except that when a plastered surface subjected bending is affected, deflection shall not exceed 1/360 of the span.
 - c. No glass breakage. Conduct uniform load structural test in accord with ASTM E330-02, Procedure A.
 - 1) Inward and outward test pressures shall be equal to 1.5 times inward and outward acting design wind pressures specified herein.
 - 2) At conclusion of tests, there shall be no glass breakage, permanent damage to fasteners or anchors, hardware parts or actuating mechanism.
 - 3) Windows, doors and operating hardware shall function satisfactorily. Storefront and entrance framing members shall have no permanent deformation.
 - d. Deflection of members in a direction parallel to wall plane, when carrying their full load, shall not exceed an amount which will reduce the glass bite below 75% of the design dimension and the member shall have a 1/8" minimum clearance between itself and the top of the fixed panel, glass, or other fixed part immediately below. Clearance between the member and an operable window or door shall be at least 1/16".

3. Static pressure air infiltration: Air leakage through fixed light areas of the storefront shall not exceed 0.06 cfm per square foot when tested in accord with ASTM E283-04 at a differential static pressure of ** 6.24 psf.
4. Static pressure water infiltration:
 - a. Water penetration is defined as the appearance of uncontrolled water other than condensation on the indoor face of wall construction.
 - b. Make provision for water entering at joints and condensation occurring within wall construction to drain to exterior face.
 - c. Fixed light areas of storefront shall permit no uncontrolled water penetration when tested in accord with ASTM E331-00. Differential static pressure used in the test shall be 10% of the upward acting design wind load specified herein but not less than 8.0 psf.

1.2 SUBMITTALS:

- A. Shop drawings: Indicate in elevation with sections and details at full scale. Include glass and metal thicknesses, joining details, field connections, anchorage, provisions for expansion, fastening and sealing methods, splice details, reinforcement, metal finishes and glazing accessories. Indicate relationship to adjacent work. Indicate compliance with specified design criteria.
- B. Product data: Provide manufacturer's complete product description, including test reports, certifying that system meets specified design criteria. Submit structural calculations for project conditions.
- C. Test reports: Submit for Architect's information only.
 1. Submit reports by an independent Testing Laboratory that storefront system proposed for use has been tested for compliance with specified design criteria.
 2. Tests shall have been made for essentially similar systems having similar glass sizes, mullion lengths, reinforcement and methods of attachment.
 3. Tests shall indicate satisfactory testing to at least structural performance criteria specified.
 4. If test data is not available for proposed systems or if data does not represent project conditions, Contractor shall be responsible for securing satisfactory tests by an independent Testing Agency acceptable to Architect. All costs for such testing shall be borne by the Contractor.
- D. Glass manufacturer's approval: Indicate on shop drawings, or by letter prior to submission of shop drawings, that selected glass manufacturers have reviewed and approved details, including glass bite, clearances, system weepage, air circulation around interior window treatments, shading by exterior building components and glazing methods.

- E. Samples:
1. Visual samples: Submit minimum 6" by 6" samples indicating full range of color to be expected in finished work.
 2. Sealant adhesion test samples: Provide samples of specified metal finish for adhesion tests by sealant manufacturer, as specified in Joint Sealants section.
- F. Maintenance data: Submit as part of Contract closeout documents. Give instructions for general maintenance and repair of surfaces and finishes. Include detailed re-glazing procedures.

1.3 QUALITY ASSURANCE:

- A. Applicable standards; standards of the following, as referenced herein:
1. Aluminum Association (AA).
 2. American Architectural Manufacturers Association (AAMA).
 3. American Welding Society (AWS).
 4. ASTM International (ASTM).
 5. Glass Association of North America (GANA).
 6. Steel Structures Painting Council (SSPC).

1.4 JOB CONDITIONS:

- A. Protection: Protect aluminum surfaces from contact with lime, mortar, cement, acids and other harmful surfaces and from careless handling, storage or machining.

1.5 WARRANTY:

- A. Manufacturer's warranty: Warrant the work of this section for three years from Date of Substantial Completion to be free from defects in workmanship and materials and that the work conforms to the final shop drawings. Warranty shall apply to both patent and latent defects but shall not include damage caused by exclusions stated in manufacturer's warranty.
- B. Finish warranty: Warrant fluoropolymer coating to remain free of checking, crazing, peeling, chalking or fading for a period of five years, beginning at Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS AND FINISH:

- A. Acceptable manufacturers; subject to compliance with specified requirements.
1. Basis of design: Kawneer Co., Inc.
 2. EFCO Corp.
 3. Gardner Engineered Metal Systems.
 4. Vistawall Architectural Products.
 5. YKK America, AP.

- B. Structural characteristics of aluminum shall be in accord with AA "Specification for Aluminum Structures."
- C. Aluminum extruded bars, rods, shapes, and tubes: Meeting ASTM B221-06; alloy, temper and wall thickness as required to meet design criteria.
- D. Aluminum sheet and plate: 5005-H34 aluminum alloy meeting ASTM B209-06 minimum 0.050" thickness
- E. Bars, rods and wire: Meeting ASTM B211-03.
- F. Standard structural shapes: Meeting ASTM B308-02.
- G. Carbon steel:
 - 1. Structural shapes, plates and bars: Meeting ASTM A36-05.
 - 2. Sheet and strip, cold rolled, structural quality: ASTM A1008-07, Grades A through E.
 - 3. Sheet and strip, hot rolled Structural quality: ASTM A1011-06b, Grades A through E.
 - 4. Sheet, hot dip galvanized, structural quality: Meeting ASTM A653-06a, Grades A through F.
 - 5. Sheet, electrolytic zinc coated: Meeting ASTM A879-06.
- H. Fasteners: Exposed fasteners shall be countersunk and shall match entrances and storefronts in color.
 - 1. Aluminum to aluminum: Aluminum or Type 304 stainless steel.
 - 2. Aluminum to stainless steel or carbon steel: Type 304 Stainless steel.
- I. Protective coatings for metals:
 - 1. Painting for carbon steel and high strength steel:
 - a. Dry environment: SSPC-PS 1.09, Three-Coat Oil Base Zinc Oxide Painting System.
 - b. Frequently wet environment: SSPC-PS 13.01, Epoxy-Polyamide Painting System.
 - c. Frequently wet salt water environment: SSPC-PS 12.01, One-Coat Zinc Rich Painting System.
 - 2. Galvanizing of carbon steel:
 - a. Steel sheets: Meeting ASTM A653-06a.
 - b. Hot dip for shapes, plates, bars and strips: Meeting ASTM A123-02.
 - c. Electro-galvanizing: Meeting ASTM B633-07.
 - d. Weight of coating: Meeting ASTM A123-02, Grade 65.
 - 3. Cold galvanizing compound: Pre-mixed, zinc dust and organic binders formulated specifically for use on steel surfaces. Compounds shall have concentrations of zinc dust in the range of 65% to 69% or above 92% in the dried film in accord with ASTM A780-01(2006).

J. Finish:

1. Exposed aluminum components and components to which exterior sealant is applied: Fluoropolymer coating finish:
 - a. Two coat, shop-applied, baked-on, fluoropolymer coating system based on minimum 70% Arkema Group, Kynar 500 or Solvay Solexis, Inc., Hylar 5000 resin (Polyvinylidene fluoride, PVDF), formulated by a licensed manufacturer and applied by manufacturer's approved applicator to meet AAMA 2605-05.
 - b. Color: Match color of metal roof and soffit panels (Berridge Manufacturing Co., Natural White).
2. Unexposed aluminum components: Mill finish.

2.2 ENTRANCE DOORS:

- A. Wide stile design: Minimum 5" wide stiles and top rail and 10" wide bottom rail.
- B. Door construction: Fabricated of extruded aluminum sections with door corners joined by concealed reinforcement, secured with bolts and screws and by Sigma deep penetration welding.
- C. Glazing:
 1. Snap-in stops with neoprene glazing gaskets.
 2. Glass and glazing accessories shall be as specified in Glazing section.
- D. Drip cap: Provide doors with drip cap at head and bottom rail to prevent water infiltration.
- E. Adjustment: Doors equipped with adjusting mechanism located in top rail near lock stile, providing for minor clearance adjustments after installation.
- F. Weatherstripping: Pile type in replaceable rabbets for stiles and rails; complying with AAMA 701.2/702-02.
- G. Hardware: Provide as specified in Door Hardware section.

2.3 STOREFRONTS AND ENTRANCE FRAMING SYSTEM:

- A. The basis of design for storefront system is Kawneer TriFab VG 451T Center Plane System. Storefront systems of similar design and construction, as manufactured by other acceptable manufacturers, may be submitted for the Architect's consideration. Acceptance is subject to compliance with specified design criteria, as evidenced by submittal of specified product data, and Architect's approval.
- B. Framing characteristics:
 1. Member size: 2" by 4-1/2".
 2. System: Two-piece face and gutter, for outside glazing.
 3. Construction: Shear block or screw spline.
 4. Glazing gaskets: As specified in Glazing section.

5. Make provisions in framing for minimum edge clearance, nominal edge cover, and nominal pocket width for thickness and type of glazing material indicated on drawings. Provisions shall be in accord with glazing material manufacturer's product data.
 6. Framing shall accommodate entrance doors indicated in door schedule and other components indicated on drawings. Bottom rail of framing adjacent to entrance doors shall match bottom rail of entrance doors.
 7. Provide framing with reinforcing members meeting design wind loading and design criteria in accord with shop drawings. Subframes and reinforcing members of carbon steel shall have a shop applied protective coating as specified herein.
- C. Perimeter sealant: As specified in Joint Sealants section.
- D. Storefront sealant:
1. Non-skinning type meeting AAMA 800-05.
 2. Provide sealants for use inside of weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. Weep hole filter material: 1/2" square by 6" long; 30-40 ppi, open cell, reticulated, polyvinyl chloride-coated, polyurethane foam block.
- F. Framing anchors: Series 300 stainless steel for all exposed fasteners and fasteners 1/4" diameter and smaller; heavy zinc-plated steel, (0.0005" thickness plating), colored chromate-coated for fasteners over 1/4" diameter. Framing anchors shall carry dead load, accommodate thermal movement, resist wind load specified herein and withstand normal loads imposed by entrance door operation.
- G. Bituminous coating for separation of dissimilar materials: Cold-applied, asphalt mastic meeting SSPC-Paint 12, minimum 30 mils thickness.
- H. Fabricate trim pieces from sheet or plate aluminum meeting requirements specified herein.
- I. Flashings and other materials used internally or externally shall be corrosion resistant, non-staining, non-bleeding and compatible with adjoining materials.

2.4 FABRICATION:

- A. General: Storefront and entrance systems shall be of materials, design, sizes and thicknesses, subject to commercial tolerances, indicated on approved shop drawings and specified herein. Methods of fabrication and assembly, unless specifically stated otherwise, shall be at manufacturer's discretion.
- B. Joints: Fabricate and assemble framing with joints only at intersections of members. Match exposed work to produce continuity of line and design, with joints, unless indicated otherwise, being accurately fitted and rigidly secured.

- C. Hardware: Drill and cut to template for finish hardware. Reinforce frames and door stiles and rails to receive finish hardware in accord with door manufacturer's product data.
- D. Protection of metals: Protect against galvanic action wherever dissimilar metals are in contact. Provide protection by painting contact surfaced with zinc chromate primer as specified herein or by application of a sealant or tape.
- E. Welding:
 - 1. Welding shall be in accord with AWS criteria and shall be done with electrodes and by methods recommended by suppliers of metals being welded. Type, size and spacing of welds shall be as indicated on approved shop drawings.
 - 2. Perform welding behind finished surfaces so as to minimize distortion and discoloration on finished side. Remove weld spatter and welding oxides on finished surfaces by descaling and grinding.
- F. Shop painting of steel: Items of steel, unless galvanized or scheduled for other finish, shall be cleaned of loose scale, dirt and foreign matter in accord with SSPC-SP 6, Commercial Blast Cleaning, and shall be coated/primed as specified herein.
- G. Sealants and sealing materials: Use sealants and sealing materials in accord with material manufacturer's product data and joints shall be in accord with designs and tolerances indicated on approved shop drawings.
- H. Shop glazing: Perform glazing work in accord with recommendations of GANA Glazing Manual and glazing material manufacturer's product data.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Storefronts: Establish bench marks at convenient points adjacent to each entrance. Be responsible for accuracy of location of perimeter lines and elevation of bench marks.
- B. Correction of errors: Should errors be found in location or elevation of perimeter lines and elevation of bench marks, installation of work shall not proceed in affected areas until errors have been corrected.

3.2 INSTALLATION:

- A. Install aluminum entrances and storefronts in accord with manufacturer's product data and approved shop drawings, plumb, level and true to line, in proper alignment and relation to established lines and grades, within specified tolerances.

- B. Anchor entrance doors in place, straight, plumb and level, without distortion, in accord with approved shop drawings. Check and adjust weatherstripping contact and hardware movement for proper operation and performance of units.
- C. Erection tolerances: Components of storefront system shall be within the following tolerances:
1. Maximum variation from plane or location indicated on approved shop drawings: 1/8" per 12'-0" of length or 1/2" in any total length.
 2. Maximum offset from true alignment between two members abutting end to end in line: 1/16".
 3. Maximum offset between framing members at corners of glazing pocket: 1/32".
- D. Installation within masonry openings: No parts other than built-in anchor devices shall be installed until masonry work is completed and cleaned.
- E. Protect aluminum in contact with masonry, steel, concrete or other dissimilar material from contact by neoprene gaskets or bituminous coating.
- F. Before anchoring to structure, shim and brace work plumb, level and in designated location. Anchorage of storefront framing to building structure shall be in accord with approved shop drawings. After wall is positioned, connections indicated on approved shop drawings shall be rigidly fixed.
- G. Welding: Protect glass and finished surfaces from damage from weld spatter. Welds and adjacent metal shall be cleaned and primed with primer specified herein.
- H. Provide sill flashing at all exterior storefronts. Flashing shall extend continuous, with joints lapped and set in storefront sealant. Provide end dams minimum 2" high.
- I. Install weep hole baffle with filter at weep holes. Install filter under 30% compression.
- J. During installation, verify that storefront system allows water which enters the system to be collected in gutters and weeped to exterior. Ascertain that weep holes are open and that metal-to-metal joints are sealed.
- K. Locate expansion mullions in accord with manufacturer's recommendations as indicated on approved shop drawings.
- L. Caulking:
1. Caulk metal-to-metal internal storefront joints using storefront sealant. Install in accord with Joint Sealants section.
 2. Caulk perimeter of storefronts using silicone sealant as specified in Joint Sealants section. Caulk both exterior and interior faces of storefront perimeter.
 3. Caulk fasteners heads penetrating storefront jamb, sill and head members.

- M. Clean exposed aluminum surfaces at completion of work, just prior to Date of Substantial Completion. Repair or replace work damaged or stained by subsequent work.
- N. Field tests: Conduct to ascertain that storefront system is watertight. Conduct generally in accord with AAMA 501.2-03. A minimum of two tests shall be performed. Tests shall be performed in the presence of Architect.

End of Section

SECTION 08 5619

TICKET WINDOWS

PART 1 - GENERAL

1.1 SUBMITTALS:

- A. Product data: Indicate material types, finishes and sizes, fabrication and installation details.
- B. Shop drawings: Indicate in elevation, with sections and details at full scale. Include glass and metal thicknesses, joining details, field connections, anchorage, fastening and sealing methods, reinforcement, metal finish, hardware and glazing accessories. Indicate relationship with adjacent and interfacing work.

1.2 DELIVERY, STORAGE AND HANDLING:

- A. Deliver and store in protective packaging to prevent soiling and physical damage.
- B. Handle to prevent damage to finished surfaces and operating mechanisms.

1.3 PROJECT/SITE CONDITIONS:

- A. Protection: Protect pre-finished surfaces from damage or staining. Provide protective covering for specialties following installation for duration of project.
- B. Coordinate installation of items required to be built into building structure. Secure templates or lay out to rough dimensions provided by manufacturer.

PART 2 - PRODUCTS

2.1 TICKET WINDOWS:

- A. Acceptable product: Nissen and Co., Inc., No. SCW 102 Factory-Assembled Cashier Unit.
- B. Characteristics:
 - 1. Type: Factory-assembled unit, 2'-0" wide by 3'-0" high, including framed glass window with circular speak hole and semi-circular pass opening, both with hinged pivoting metal frames and covers, and an integral 2'-0" wide by 1'-6" deep by 2" thick stainless steel counter.
 - 2. Frame: Extruded 6063-T5 aluminum alloy in manufacturer's standard clear anodized finish. Provide surround framing for installation within prepared wall opening.
 - 3. Glazing: Factory-glazed using 1/4" thickness clear tempered glass and resilient gaskets as specified in Glazing section.

4. Ticket window: Extruded aluminum, semi-circular, 4" radius design for installation in 1/4" thickness glass; swing-away door equipped with tamperproof spring-loaded snap lock and retaining pin.
5. Speak hole: Aluminum, circular design with louver type opening for installation in 1/4" thickness glass; minimum 4-1/4" radius.
6. Aluminum finish: Manufacturer's standard clear anodized aluminum.
7. Counter: Minimum 18 ga. #4 satin finish stainless steel, one-piece construction with corners mitered, welded, ground smooth and finished to match adjacent surfaces.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install ticket windows in accord with manufacturer's product data and approved shop drawings. Install plumb within surround framing using concealed anchor bolts and expansion shields in accord with manufacturer's product data. Adjust for smooth operation and secure locking of hinged components.
- B. Protect pre-finished surfaces and glass from damage or staining. Clean surfaces and polish glass both sides prior to Date of Substantial Completion.

End of Section

SECTION 08 7100

DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.

- B. This Section includes the following:

- 1. Hinges
- 2. Continuous hinges
- 3. Pivots
- 4. Spring hinges
- 5. Key control system
- 6. Lock cylinders and keys
- 7. Lock and latch sets
- 8. Bolts
- 9. Exit devices
- 10. Push/Pull units
- 11. Closers
- 12. Overhead holders
- 13. Miscellaneous door control devices
- 14. Door trim units
- 15. Protection plates
- 16. Weatherstripping for exterior doors
- 17. Sound stripping for interior doors
- 18. Automatic drop seals (door bottoms)
- 19. Astragals or meeting seals on pairs of doors
- 20. Thresholds

- C. Related Sections: The following Sections contain requirements that relate to this Section:

- 1. Section 01 2100: Allowances
- 2. Section 08 1100: Hollow Metal Doors and Frames
- 3. Section 08 1200: Hollow Metal Frames
- 4. Section 08 1400: Wood Doors
- 5. Section 08 1713: Integrated Metal Door Opening Assemblies
- 6. Section 08 1723: Integrated Wood Door Opening Assemblies
- 7. Section 08 3323: Overhead Coiling Doors

8. Section 08 4113: Aluminum-Framed Entrances and Storefronts
9. Section 08 4413: Glazed Aluminum Curtain Walls
10. Division 26: Electrical

- D. Products furnished but not installed under this Section to include:
1. Cylinders for locks on entrance doors.
 2. Final replacement cores and keys to be installed by Owner.

1.3 REFERENCES

- A. Standards of the following as referenced:
1. American National Standards Institute (ANSI)
 2. Door and Hardware Institute (DHI)
 3. Factory Mutual (FM)
 4. National Fire Protection Association (NFPA)
 5. Underwriters' Laboratories, Inc. (UL)
 - a. UL 10C - Fire Tests Door Assemblies
 6. Warnock Hersey
- B. Regulatory standards of the following as referenced:
1. Department of Justice, Office of the Attorney General, *Americans with Disabilities Act*, Public Law 101-336 (ADA).
 2. CABO/ANSI A117.1: *Providing Accessibility and Usability for Physically Handicap People*, 1992 edition.

1.4 SYSTEM DESCRIPTION

- A. Refer to applicable Headings for system description for electric and electro-pneumatic hardware products.

1.5 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.
- B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements. For items other than those scheduled in the Headings of Section 3, provide catalog information for the specified items and for those submitted.
- C. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into vertical format

- "hardware sets" indicating complete designations of every item required for each door or opening. Use specification Heading numbers with any variations suffixed a, b, etc. Include the following information:
- b. Type, style, function, size, and finish of each hardware item.
 - c. Name and manufacturer of each item.
 - d. Fastenings and other pertinent information.
 - e. Location of each hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
 - f. Explanation of all abbreviations, symbols, and codes contained in schedule.
 - g. Mounting locations for hardware.
 - h. Door and frame sizes and materials.
 - i. Keying information.
 - j. Cross-reference numbers used within schedule deviating from those specified.
 - 1) Column 1: State specified item and manufacturer.
 - 2) Column 2: State prior approved substituted item and its manufacturer.
2. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
 3. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- D. Samples of each type of exposed hardware unit in finish indicated and tagged with full description for coordination with schedule. Submit samples prior to submission of final hardware schedule.
1. Samples will be returned to the supplier. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated in the Work, within limitations of keying coordination requirements.
- E. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- F. Contract closeout submittals:

1. Operation and maintenance data: Complete information for installed door hardware.
2. Warranty: Completed and executed warranty forms.

1.6 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer.
- B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced architectural hardware consultant (AHC) or equivalent who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.
 1. Require supplier to meet with Owner to finalize keying requirements and to obtain final instructions in writing.
 2. Require supplier to meet with installer prior to beginning of installation of door hardware.
- C. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and tested by UL or Warnock Hersey for given type/size opening and degree of label. Provide proper latching hardware, door closers, approved-bearing hinges and seals whether listed in the Hardware Schedule or not. All hardware shall comply with standards UBC 7-2 (1997) and UL 10C.
 1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors UL labels indicating Fire Door to be equipped with Fire Exit Hardware) provide UL label on exit devices indicating Fire Exit Hardware.

1.7 PRODUCT HANDLING

- A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.

- C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).
- E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

1.8 WARRANTY

- A. Special warranties:
 - 1. Door Closers: Ten year period
 - 2. Exit Devices: Three year period
 - 3. Automatic Door Operators: Two year period
 - 4. Locks and Cylinders: Three year period

1.9 MAINTENANCE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

(* Denotes manufacturer referenced in the Hardware Headings)

- A. Hinges:
 - 1. Acceptable manufacturers:
 - a. Bommer
 - b. Ives
 - c. PBB*
 - 2. Characteristics:
 - a. Templates: Provide only template-produced units.
 - b. Screws: Provide Phillips flat-head screws complying with the following requirements:
 - 1) For metal doors and frames install machine screws into drilled and tapped holes.
 - 2) For wood doors and frames install threaded-to-the-head wood screws.
 - 3) For fire-rated wood doors install #12 x 1-1/4 inch, threaded-to-the-head steel wood screws.
 - 4) Finish screw heads to match surface of hinges or pivots.

- c. Hinge pins: Except as otherwise indicated, provide hinge pins as follows:
 - 1) Out-Swing Exterior Doors: Non-removable pins.
 - 2) Out-Swing Corridor Doors with Locks: Non-removable pins.
 - 3) Interior Doors: Non-rising pins.
 - 4) Tips: Flat button and matching plug. Finished to match leaves.
 - d. Size: Size hinges in accordance with specified manufacturer's published recommendations.
 - e. Quantity: Furnish one pair of hinges for all doors up to 5'0" high. Furnish one hinge for each additional 2-1/2 feet or fraction thereof.
- B. Continuous Hinges:
- 1. Acceptable manufacturers:
 - a. PBB
 - b. Select Products*
 - c. Zero
 - 2. Characteristics:
 - a. Continuous gear hinges to be manufactured of extruded 6063-T6 aluminum alloy with anodized finish, or factory painted finish as scheduled.
 - b. All hinges are to be manufactured to template. Uncut hinges shall be non-handed and shall be a pinless assembly of three interlocking extrusions applied to the full height of the door and frame without mortising.
 - c. Vertical door loads shall be carried on chemically lubricated PBT resin thrust bearings. The door and frame leaves shall be continually geared together for the entire hinge length and secured with a full cover channel. Hinge to operate to a full 180°.
 - d. Hinges to be milled, anodized and assembled in matching pairs. Fasteners supplied shall be 410 stainless steel, plated and hardened.
 - e. Provide UL listed continuous hinges at fire doors. Continuous hinges at fire doors (suffix - FR) shall meet the required ratings without the use of auxiliary fused pins or studs.
- C. Cylinders:
- 1. Acceptable manufacturers:
 - a. Corbin/Russwin
 - b. Sargent
 - c. Schlage*
 - 2. Characteristics:
 - a. Standard System: Except as otherwise indicated, provide new master key system for Project.
 - b. Metals: Construct lock cylinder parts from brass or bronze, stainless steel, or nickel silver.

- c. Comply with Owner's instructions for master keying and, except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.
 - 1) Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol, and notation, "DO NOT DUPLICATE."
 - d. Provide construction keying for use during construction period. After Date of Substantial Completion, void construction keying with Owner's permanent keying.
 - e. Key Material: Provide keys of nickel silver only.
 - f. Key Quantity: Furnish 3 change keys for each lock, 5 master keys for each master system, 5 grandmaster keys for each grandmaster system.
 - 1) Furnish one extra blank for each lock.
 - 2) Deliver keys to Owner.
- D. Locksets, Latchsets, Deadbolts:
- 1. Acceptable manufacturers:
 - a. Corbin/Ruswin
 - b. Sargent
 - c. Schlage*
 - 2. Mortise Locksets and Latchsets: as scheduled.
 - a. Chassis: cold-rolled steel, handing field-changeable without disassembly.
 - b. Latchbolts: 3/4-inch throw stainless steel anti-friction type.
 - c. Lever Trim: through-bolted, accessible design, cast or solid rod lever as scheduled. Spindles: independent break-away.
 - d. Thumbturns: accessible design not requiring pinching or twisting motions to operate.
 - e. Deadbolts: stainless steel 1-inch throw.
 - f. Electric operation: Manufacturer-installed continuous duty solenoid.
 - g. Strikes: 16 gage curved stainless steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
 - h. Scheduled Lock Series and Design: Schlage L series, 06 lever design.
 - i. Certifications:
 - 1) ANSI A156.13, 1994, Grade 1 Operational, Grade 1 Security. [Change Grade 2 Security if interchangeable core]
 - 2) ANSI/ASTM F476-84 Grade 30 UL Listed.
 - 3. Deadbolts: as scheduled. Rotating cylinder trim rings of attack-resistant design. Mounting plates and actuator shields of plated cold-rolled steel. Mounting screws of 1/4" dia. steel and protected by

drill-resistant ball bearings. Steel alloy deadbolt with hardened steel roller. Strike with 1/8" thick strike reinforcer and two 3" long screws. ANSI A156.5, 1992 Grade 1 certified.

E. Exit Devices:

1. Acceptable manufacturers:
 - a. Precision, 2100 Series
 - b. Sargent, 16-19-GL-SS-80 Series
 - c. Von Duprin*, 98 Series
2. Characteristics:
 - a. Exit devices shall be "UL" listed for life safety. All exit devices for fire rated openings shall have "UL" labels for "Fire Exit Hardware."
 - b. Exit devices mounted on labeled wood doors shall be thru-bolted mounted on the door per the door manufacturers requirements.
 - c. Trim shall be thru-bolted to the lock stile case.
 - d. Provide glass bead conversion kits to shim exit devices on doors with raised glass beads.
 - e. Exit devices shall be one manufacturer.
 - f. Exit devices shall be non-handed. Touchpad shall extend a minimum of 1/2 of the door width and shall be a minimum of 2-3/16" in height. Plastic touchpads are not acceptable. All latchbolts to be the deadlocking type. Latchbolts shall have a self-lubricating coating to reduce wear. Plated or plastic coated latchbolts are not acceptable. Plastic linkage and "dogging" components are not acceptable.
 - g. Lever trim shall be solid case material with a break-away feature to limit damage to the unit from vandalism.
 - h. Surface vertical rod devices shall be UL labeled for fire door applications without the use of bottom rod assemblies. Where bottom rods are required for security applications, the devices shall be UL labeled for fire doors applications with rod and latch guards by the device manufacturer.

F. Closers and Door Control Devices:

1. Acceptable manufacturers:
 - a. Corbin/Russwin, 6200 Series
 - b. LCN Closers, 4011/4111 Series
 - c. Sargent, 280 Series
2. Characteristics:
 - a. Door closers shall have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder.

- b. Closers shall utilize a stable fluid withstanding temperature range of 120°F to -30°F without seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with standards UBC 7-2 (1997) and UL 10C.
 - c. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed and back check.
 - d. Closers shall have solid forged steel main arms (and forearms for parallel arm closers) and where specified shall have a cast-in solid stop on the closer shoe ("CNS"). Where door travel on out-swing doors must be limited, use "CNS" or "S-CNS" type closers. Auxiliary stops are not required when crush type closers are used.
 - e. Overhead concealed closers shall have spring power adjustable for 50% increase in closing power and fully mortised door tracks.
 - f. Closers (overhead, surface and concealed) shall be of one manufacturer and carry manufacturer's ten year warranty (electric closers to have two year warranty).
 - g. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units complying with ADA and ANSI A-117.1 provisions for door opening force.
 - h. Closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors shall provide for corridor clear width as required by code. Where possible, mount closers inside rooms.
 - i. Powder coating finish to be certified to exceed 100 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification.
 - j. Combination Door Closers and Holders: Provide units designed to hold door in open position under normal usage and to release and automatically close door under fire conditions. Incorporate an integral electromagnetic holder mechanism designed for use with UL listed fire detectors, provided with normally closed switching contacts.
- G. Overhead Door Holders:
- 1. Acceptable manufacturers:

- a. Glynn Johnson
 - b. Rixson Firemark
 - c. Rockwood Manufacturing*
2. Characteristics:
 - a. Provide (heavy duty and/or medium duty and/or light duty) door holders (concealed and or surface mounting) of brass, bronze or stainless steel.
 - b. Concealed holders to be installed with the jamb bracket mortised flush with the bottom of the jamb. The arm and channel to be mortised into the door.
 - c. Surface holders to be installed with the jamb bracket mounted on the stop.
- H. Floor Stops and Wall Bumpers:
1. Acceptable manufacturers:
 - a. Burns
 - b. Ives
 - c. Rockwood Manufacturing*
 2. Characteristics: Refer to Hardware Headings.
- I. Door Bolts/Coordinators:
1. Acceptable manufacturers:
 - a. Burns
 - b. Ives
 - c. Rockwood Manufacturing*
 2. Characteristics:
 - a. Flush bolts to be forged brass 6-3/4" x 1", with 1/2" diameter bolts. Plunger to be supplied with milled surface one side that fits into a matching guide.
 - b. Automatic flush bolts to be UL listed as top and bottom bolts on a pair of classified fire doors. Bolt construction to be of rugged steel and brass components.
 - c. Self latching flush bolts to be UL listed as top and bottom bolts on a pair of classified fire doors. Bolt construction to be of rugged steel and brass components.
 - d. Automatic flush bolts and self-latching flush bolts shall be UL listed for fire door application without bottom bolts (LBB).
 - e. Coordinator to be soffit mounted non-handed fully automatic UL listed coordinating device for sequential closing of paired doors with or without astragals.
 - f. Provide filler pieced to close the header. Provide brackets as required for mounting of soffit applied hardware.

- J. Push Plates:
1. Acceptable manufacturers:
 - a. Burns
 - b. Ives
 - c. Rockwood Manufacturing*
 2. Characteristics:
 - a. Exposed Fasteners: Provide manufacturers standard exposed fasteners.
 - b. Material to be wrought/extruded/forged, brass/bronze /aluminum/stainless steel, per the Hardware Headings.
 - c. Provide plates sized as shown in Hardware Headings.
- K. Door Pulls & Pull Plates:
1. Acceptable manufacturers:
 - a. Burns
 - b. Ives
 - c. Rockwood Manufacturing*
 2. Characteristics:
 - a. Provide concealed thru-bolted trim on back to back mounted pulls, but not for single units.
 - b. Material to be extruded forged/ cast brass / bronze / aluminum / stainless steel.
 - c. Provide units sized as shown in Hardware Headings.
- L. Push Pull Sets:
1. Acceptable manufacturers:
 - a. Burns
 - b. Ives
 - c. Rockwood Manufacturing*
 2. Characteristics:
 - a. Provide mounting systems as shown in hardware sets.
 - b. Material to be (description - i.e. solid rod, tubular, cast etc.). Brass/bronze aluminum/stainless steel.
 - c. Provide Push/Pull sets sized as shown in Hardware Headings.
- M. Protective Plates:
1. Acceptable manufacturers:
 - a. Burns
 - b. Ives
 - c. Rockwood Manufacturing*
 2. Characteristics:
 - a. Provide manufacturers standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws.
 - b. Materials:
 - 1) Metal Plates: Stainless Steel, .050 inch (U.S. 18 gage).

- 2) Armor plates on fire doors to comply with NFPA 80. Protection plates to be sized as follows:
 - a) Kick plates: 8" high x 2" LDW on singles, 1" LDW on pairs.
 - b) Mop plates: 4" high x 1" LDW.
 - c) Armor plates: 36" high x 2" LDW on singles, 1" LDW on pairs.
- N. Thresholds:
1. Acceptable manufacturers:
 - a. National Guard Products, Inc.*
 - b. Reese Industries
 - c. Zero Weatherstripping Co., Inc.
 2. Types: Indicated in Hardware Headings.
- O. Door Seals/Gasketing:
1. Acceptable manufacturers:
 - a. National Guard Products, Inc.*
 - b. Reese Industries
 - c. Zero Weatherstripping Co., Inc.
 2. Types: Indicated in Hardware Headings.
- P. Silencers:
1. Acceptable manufacturers:
 - a. Deutscher & Daughter
 - b. Ives
 - c. Rockwood Manufacturing*
 2. Three for each single doors; four for pairs of doors.
- Q. Key Cabinet and System:
1. Acceptable manufacturers:
 - a. Lund
 - b. Telkee, Inc.*
 2. Provide a key control system including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150 percent of the number of locks required for the Project.
 - a. Provide complete cross index system set up by key control distributor, and place keys on markers and hooks in the cabinet as determined by the final key schedule.
 - b. Provide hinged-panel type cabinet for wall mounting.
- R. Security Equipment:
1. Acceptable manufacturers:
 - a.
 2. Characteristics:
 - a. Provide items as found in Hardware Headings.

3. Coordinate security equipment with Electrical.

2.2 MATERIALS AND FABRICATION

- A. Manufacturer's Name Plate: Do not use manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise acceptable to Architect.
1. Manufacturer's identification will be permitted on rim of lock cylinders only.
- B. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.
- C. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
1. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
 2. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
 3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners.
 4. Do not use thru-bolts or sex bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of adequately fastening the hardware, or otherwise found in Headings. Coordinate with wood doors and metal doors and frames where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.

2.3 HARDWARE FINISHES

- A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets (or push-pull units if no

latch or lock sets).

- B. Provide finishes that match those established by ANSI or, if none established, match the Architect's sample.
- C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
- D. Provide protective lacquer coating on all exposed hardware finishes of brass, bronze, and aluminum, except as otherwise indicated. The suffix "-NL" is used with standard finish designations to indicate "no lacquer."
- E. The designations used to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.
 - 1. Hinges (Exterior): 630 (US32D) Satin Stainless Steel
 - 2. Hinges (Interior wood doors): 652 (US26D) Satin Chrome Plated Steel
 - 3. Hinges (Interior metal doors): 600 (USP)
 - 4. Continuous Hinges: 628 (US28) Clear Anodized Aluminum
 - 5. Flush Bolts: 626 (US26D) Satin Chrome Plated Brass/Bronze
 - 6. Locks: 630 (US32D) Satin Stainless Steel
 - 7. Exit Devices: 630 (US32D) touchpads, balance to match adjacent hardware
 - 8. Door Closers: Powder Coat to match adjacent hardware
 - 9. Push Plates: 630 (US32D) Satin Stainless Steel
 - 10. Pull Plates: 630 (US32D) Satin Stainless Steel
 - 11. Protective Plates: 630 (US32D) Satin Stainless Steel
 - 12. Door Stops: 626 (US26D) Satin Chrome Plated Brass/Bronze
 - 13. Overhead Holders: 630 Satin Stainless Steel and 689 Powder Coated Steel (as scheduled)
 - 14. Thresholds/Weatherstripping: 627/628 (US27/US28) Aluminum

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.
 - 1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.

2. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."
 - B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.
 - C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
 - D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
 - E. Where both floor stops and wall stops are specified in headings, select the proper stop based upon conditions at each opening in that heading. Use a floor stop only when conditions would prohibit using a wall stop.
 - F. Where both pull-side and push-side closers are specified in headings, select the proper closer based upon conditions at each opening in that heading. Closers shall be installed on non-public side of door.
 - G. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 "Joint Sealers".
 - H. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.
- 3.2 ADJUSTING, CLEANING, AND DEMONSTRATING
- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
 1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors.

Adjust door control devices to function properly with final operation of heating and ventilating equipment.

- B. Clean adjacent surfaces soiled by hardware installation.
- C. Door Hardware Supplier's Field Service
 - 1. Inspect door hardware items for correct installation and adjustment after complete installation of door hardware.
 - 2. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.
 - 3. File written report of this inspection to Architect.
- D. Prior to project completion, representatives of the lock, exit device and overhead closer manufacturers shall inspect and adjust all units and certify that all units are installed in accordance with the manufacturer's instructions, and are regulated properly and functioning correctly. A written report shall be provided to the Architect as to the inspection and shall include appropriate certificates.

3.3 HARDWARE SCHEDULE

HEADING #1

DOORS# A100

EACH PAIR TO HAVE

2	CONTINUOUS HINGES	SL11HD
1	SET FLUSHBOLTS	555 X 570 (INACTIVE)
1	DEADLOCK	MS1850S X 4066 (ACTIVE)
1	CYLINDER	20-000
2	PUSH/PULL SETS	RM251 X TYPE 5/12 MTG.
2	CLOSERS	2030-H X 2030-169
2	DOOR STOPS	481H X EXT.
1	THRESHOLD	513
1	SET DOOR SEALS	BY DOOR MANUFACTURER
2	DOOR BOTTOM SEALS	BY DOOR MANUFACTURER
1	ASTRAGAL SET	BY DOOR MANUFACTURER

HEADING #2

DOORS # A101, A107, A108, A114, A115

EACH DOOR TO HAVE

3	HINGES	BB81
1	LOCKSET	L9070
1	OVERHEAD HOLDER	14114 (@ A101)
1	MOP PLATE	K1050 (@ A107)
1	DOOR STOP	400 (@ A107, A114, A115)
1	DOOR STOP/HOLDER	494/491 (FLOOR STOP AS REQUIRED @ A108)

HEADING #3

DOORS # A103, A111

EACH DOOR TO HAVE

1	CONTINUOUS HINGE	SL24HD
1	DEADLOCK	L463
1	PUSH PLATE	71E
1	PULL	RM301 X TYPE 9 MTG.
1	CLOSER	4111-H
1	KICK PLATE	K1050
1	DOOR STOP	400

HEADING #4

DOORS # A106

EACH DOOR TO HAVE

1	CONTINUOUS HINGE	SL24
1	PASSAGE SET	L9010
1	DOOR STOP	400
1	THRESHOLD	411
1	SET DOOR SEALS	155S
1	DOOR BOTTOM SEAL	4440S

NOTE: MOUNT THRESHOLD UNDER DOOR BOTTOM.

HEADING #5

DOORS # A109

EACH DOOR TO HAVE

3	HINGES	BB81
1	LOCKSET	L9080
1	CLOSER	4111
1	DOOR STOP	400
1	THRESHOLD	411
1	SET DOOR SEALS	155S
1	DOOR BOTTOM SEAL	220S

NOTE: MOUNT THRESHOLD UNDER DOOR BOTTOM.

HEADING #6

DOORS # A116, A117, A 120, D102

EACH DOOR TO HAVE

3	HINGES	BB81
1	PRIVACY SET	L9040
1	MOP PLATE	K1050 (@ A117, A120, D102)
1	DOOR STOP	400/445 (FLOOR STOP AS REQUIRED)
1	THRESHOLD	411 (@ A116, A120)
1	SET DOOR SEALS	5020 (@ A116, A120)
1	DOOR BOTTOM SEAL	200S (@ A116, A120)
1	COAT HOOK	RM801

NOTE: MOUNT THRESHOLD UNDER DOOR BOTTOM.

HEADING #7

DOORS # A119A

EACH PAIR TO HAVE

6	HINGES	4B51
1	SET AUTO FLUSHBOLTS	1848 (INACTIVE)
1	COORDINATOR	1672 X BRACKETS AS REQUIRED
1	LOCKSET	L9070 (ACTIVE)
2	CLOSERS	4111
2	DOOR STOPS	400/445 (FLOOR STOP AS REQUIRED)
1	SET DOOR SEALS	155S
1	ASTRAGAL SET	115N

HEADING #8

DOORS # A119B, B103A, B103B, D101

EACH DOOR TO HAVE

1	CONTINUOUS HINGE	SL18HD
1	LOCKSET	L9453
1	CLOSER	4111-H-S-CNS (@ A119B, B103A, B103B)
1	CLOSER	4011-H (@ D101)
1	DOOR STOP	445 (@ D101)
1	KICK PLATE	K1050 (@ D101)
1	ARMOR PLATE	K1050 (@ A119A, B103A, B103B)
1	THRESHOLD	425 (@ D101)
1	THRESHOLD	513HD (@ A119A, B103A, B103B)
1	SET DOOR SEALS	155S
1	DOOR BOTTOM SEAL	200S

HEADING #9

DOORS # A119C, A119D, B101A, B102A, B103C, B103D, B103E, C101A, C102A

ALL HARDWARE BY DOOR SUPPLIER

HEADING #10

DOORS # A121A, A121B

EACH PAIR TO HAVE

10	HINGES	4B51 X NRP
1	SURFACE BOLT	585-12 (INACTIVE)
1	SURFACE BOLT	585-24 (INACTIVE)
1	LOCKSET	L9070 (ACTIVE)
2	ARMOR PLATES	K1050
2	DOOR STOP/HOLDERS	494/491 (FLOOR STOP AS REQUIRED)

HEADING #11

DOORS # A122

EACH DOOR TO HAVE

3	HINGES	BB51
1	LOCKSET	L9050
1	DOOR STOP	400
1	THRESHOLD	411
1	SET DOOR SEALS	5020
1	DOOR BOTTOM SEAL	200S
1	COAT HOOK	RM801

NOTE: MOUNT THRESHOLD UNDER DOOR BOTTOM.

HEADING #12

DOORS # B101B, B102B, C101B, C101C, C102B, C103B

EACH DOOR TO HAVE

3	HINGES	BB51 X NRP
1	DEADLOCK	L463
1	FLUSH PULL	94

HEADING #13

DOORS # C103A

EACH DOOR TO HAVE

3	HINGES	BB51 X NRP
1	LOCKSEET	L9080
1	CLOSER	4111-H-CNS
1	KICK PLATE	K1050
1	THRESHOLD	425
1	SET DOOR SEALS	155S
1	DOOR BOTTOM SEAL	200S
1	LATCH PROTECTOR	320

END OF SECTION

SECTION 08 8000

GLAZING

PART 1 - GENERAL

1.1 SUMMARY:

- A. Related work:
 - 1. Aluminum-framed entrances and storefronts.
 - 2. Joint sealants.

1.2 SUBMITTALS:

- A. Samples: Submit minimum 1'-0" by 1'-0" samples of each type glazing material proposed for use, if requested by the Architect.
- B. Product data: Submit for each type of glazing material and accessory product specified. Include technical data, storage and handling procedures and performance characteristics.
- C. Framing manufacturer's approval: Prior to submission of shop drawings, indicate by letter that an authorized representative of storefront framing manufacturer has reviewed and approved details, including glass bite, clearances and glazing methods.
- D. Calculations: Submit for Architect's information only. Submit calculations prepared by glazing material manufacturer indicating recommendations for glass thickness and heat treating of glazing materials as a result of heat stress, building orientation, inside window treatments, shading by exterior building components or wind loading. Identify factors affecting breakage probability which have been taken into consideration and breakage probability anticipated by calculations.
- E. Maintenance data: Submit glazing material manufacturer's maintenance data for cleaning and care of each type of glazing material.

1.3 QUALITY ASSURANCE:

- A. Applicable standards:
 - 1. American National Standards Institute (ANSI), "Safety Performance Standards and Methods of Tests for Safety Glazing Materials used in Buildings," Z97.1.
 - 2. ASTM International (ASTM), standards as referenced herein.
 - 3. Consumer Product Safety Commission (CPSC), "Safety Standard for Architectural Glazing Materials," 16-CFR, Chapter II, Part 1201.
 - 4. Glass Association of North America (GANA) "Glazing Manual".
- B. Design criteria:
 - 1. Wind loads: Comply with wind load criteria specified in Aluminum-Framed Entrances and Storefronts section.

2. Thermal insulating units: Units shall comply with the requirements of ASTM E773-01 and be certified by Associated Laboratories, Inc., (ALI) or Insulating Glass Certification Council (IGCC) for Class A.
3. Tinted glass types, whether used in a monolithic state or as a lite of a thermal insulating unit, shall each be the product of a single manufacturer.
4. Glazing materials, whether in monolithic state or as a lite of a thermal insulating unit, shall be heat treated where required by glass manufacturer's design calculations to resist stress caused by glass orientations, sizes and configurations, heat stress, inherent imperfections, wind loading, glazing conditions, temperature differential, inside window treatments or other conditions affecting breakage probability. Maximum allowable breakage probability at design loads shall be eight lites per thousand for vertical glazing.
5. For heat-treated glass, orient lites with roll distortion parallel to head and sill members.
6. Tempered glazing materials shall comply with CPSC 16-CFR, Part 1201, Category II.

C. Allowable tolerances; multiple mirror installations:

1. Fabrication tolerances:
 - a. Variation in mirror dimensions: $\pm 1/32$ ".
 - b. Variation in square (diagonal measurements): $\pm 1/16$ ".
2. Installation tolerances:
 - a. Variation in plumb or square: $\pm 1/8$ " in 10'-0".
 - b. Variation in face plane of adjacent mirrors: $\pm 1/32$ ".

1.4 DELIVERY, STORAGE AND HANDLING:

- A. Store glazing materials indoors in cool, dry area, off floor, supported to prevent stress and breakage.
- B. Move no cases which have been partially unpacked. Unpack glazing materials in accord with manufacturer's product data for type of material being handled. Stack individual lites as recommended by manufacturer's product data.
- C. Utilize rolling blocks to rotate glazing materials.
- D. Handle insulating units without rotating, warping or "cartwheeling" units. Prevent damage to glazing material or edge seal.

1.5 WARRANTIES:

- A. Thermal insulating units: Warrant from failure due to loss of edge seal for a period of ten years, beginning at Date of Substantial Completion.
- B. Glass replacement warranty: Include a three-year warranty covering glazing materials and labor to replace glazing damaged for any reason other than natural disasters, vandalism or damage resulting from accident or abuse arising out of the Owner's operations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Acceptable float glass manufacturers; subject to compliance with specified requirements:
 - 1. ACH Glass Operations.
 - 2. AFG Glass.
 - 3. Guardian Industries Corp.
 - 4. Pilkington, Building Products North America.
 - 5. PPG Industries, Inc./Glass Group.

- B. Acceptable glass unit fabricators; subject to compliance with specified requirements:
 - 1. AFGD, Inc.
 - 2. Guardian Industries Corp.
 - 3. Oldcastle, Inc.
 - 4. Pilkington, Building Products North America.
 - 5. PPG Industries, Inc./Glass Group.
 - 6. Viracon, Inc.

- C. Acceptable low-emissivity (Low-E) glass fabricators; subject to compliance with specified requirements:
 - 1. ACH Glass Operations.
 - 2. AFG Glass.
 - 3. Guardian Industries Corp.
 - 4. Oldcastle, Inc.
 - 5. Pilkington, Building Products North America.
 - 6. PPG Industries, Inc./Glass Group.
 - 7. Viracon, Inc.

2.2 GLAZING MATERIALS:

- A. General transparent flat glass standard: Comply with ASTM C1036-06, Type I Glazing Select Quality for all transparent clear and tinted glass, Type I Mirror Select Quality for all mirrors, Type I Decorative Quality for custom decorative glass.

- B. Tempered, clear float glass: Minimum 1/4" thickness, fully tempered, complying with ASTM C1048-04.

- C. Tempered, thermal insulating units:
 - 1. Inboard lite: Clear color, tempered float glass with Low-E coating on #3 surface; 1/4" thickness.
 - 2. Outboard lite: Clear color, tempered float glass; 1/4" thickness.
 - 3. Unit thickness: 1" minimum.
 - 4. Spacer: Manufacturer's standard steel or aluminum spacer with welded, soldered, fused or bent corners and welded, soldered or fused splices and joints, filled with desiccant; to provide a 1/2" thickness, hermetically sealed, dehydrated air space.

- D. Unframed mirrors: 1/4" thickness, Mirror Select Quality plate or float glass with silver coating and electrologically copper-plated back. Grind and polish edges to be exposed in finished work and edges for butt joints. Where multiple mirrors are required, provide mirrors of maximum equal widths, except where joints are indicated on drawings. Furnish full lengths; no horizontal joints acceptable.
- E. Frosted glass: Monolithic exterior clear vision glass, frosted on interior side, tempered as required by use; 1/4" minimum thickness.

2.3 GLAZING ACCESSORIES:

- A. Setting blocks: Neoprene, 70-90 Shore A durometer hardness, meeting ASTM C864-05.
- B. Edge blocks: Neoprene, 60-70 Shore A durometer hardness, meeting ASTM C864-05.
- C. Spacers: Neoprene, 40-50 Shore A durometer hardness, meeting ASTM C864-05.
- D. Glazing gaskets: Glazing assembly manufacturer's standard extruded or molded neoprene or Ethylene Propylene Diene Monomer (EPDM) gaskets.
- E. Polyvinyl chloride foam tape for interior glazing: Closed cell self-adhesive tape meeting ASTM D1667-05.
- F. Mirror channel: C.R. Laurence Co., Inc., D636A; natural anodized aluminum J-channel, 3/8" face, full mirror length.
- G. Mirror adhesive:
 - 1. Acceptable products:
 - a. Miracle Adhesives Co., Type M, Black Magic.
 - b. Palmer Products Corp., Mirro-Mastic.
 - c. Pecora Corp., THR4, Mirror-Tac.
 - 2. Type: An adhesive setting compound, produced specifically for setting mirrors and certified by both mirror manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.
 - 3. VOC Content: Not more than 70 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Verify compliance with the following requirements prior to beginning glazing work:
 - 1. That framing is anchored in position, plumb and square within 1/8" of nominal dimensions indicated.
 - 2. That fastener heads, and other projections are removed from glazing rabbets.
 - 3. That corners and fabrication intersections are sealed and framing is weathertight.

4. That rabbets at sills weep to outside and rabbets are of sufficient depth and width to receive glazing material and provide the required bite of the glazing material.
5. That hollow metal frames have received paint finish in accord with Painting and Coating section.

3.2 PRE-GLAZING CONFERENCE:

- A. Prior to beginning glass and glazing work, a preglazing conference will be held to review work to be accomplished.
- B. Contractor, Architect, aluminum storefront supplier and erector, a representative of glass manufacturer, a representative of sealant manufacturer and glazing subcontractor will be present.
- C. Contractor shall notify all parties at least seven days prior to time of conference.
- D. Material submitted by Contractor, interfacing of glass and glazing and window wall work, dimensions and tolerances, sealant joint widths and depths ** and butt joint glazing ** shall be reviewed.

3.3 PERFORMANCE REQUIREMENTS:

- A. Install glazing materials to obtain airtight and watertight installation and to withstand normal temperature changes and wind loads without failure.
- B. Protect glazing material faces and edges during handling and installation.
- C. Size glazing materials for each opening to ensure correct bite on glazing material, without imposing strain, in accord with manufacturer's product data.
- D. Maintain minimum bed clearance between glazing material and sash of 1/8", both sides, except where greater clearance is required by either glazing material or framing manufacturer.

3.4 PREPARATION OF SURFACES:

- A. Clean glass edges and framing glazing channel of debris and protective coatings immediately prior to glazing. Use material acceptable to framing, glazing material and glazing sealant manufacturers.
- B. Inspect glazing material prior to installation. Eliminate lites having face or edge damage.
- C. Lites of tempered and insulating glass shall not be cut or otherwise altered in the field.

3.5 GLAZING PROCEDURES:

- A. Install glazing materials in accord with manufacturer's product data and applicable standards, except where more stringent requirements are specified.

- B. Install setting blocks for all glazing materials over six sq. ft. in area. Install at sill rabbet at quarter points. Size setting blocks in proportion to glass weight; minimum 4" length.
- C. Shim all lites over 100 united inches, inboard and outboard, on all sides using continuous shims, except where gaskets accomplish shimming.
- D. Storefront glazing: Apply gasket to interior stop with mitered corners. Center glazing material in rabbet. Apply exterior gasket, with mitered corners. Oversize gaskets to compress miter joints to positive seal.
- E. Interior channel glazing: Glaze using polyvinyl chloride tape applied to both sides, all stops. Place tape, with butted joints. Compress tape approximately 30 percent. Center glazing material in rabbet.
- F. Mirrors: Provide continuous mirror channel along bottom edge of mirror. Secure with toggle bolts at 1'-4" o. c., maximum. Install mirror bottom in channel, mirror back using adhesive in accord with manufacturer's product data.
- G. Multiple mirror installation:
 - 1. Prior to beginning installation, examine substrates to receive mirrors for out-of-plane surfaces affecting mirror installation.
 - 2. Set mirrors in full bed of adhesive; allow no adhesives to migrate to face or edges of mirrors.
 - 3. Set mirrors plumb and level and in a straight plane so that no interruption of image occurs at mirror joints.

3.6 PROTECTION AND CLEANING:

- A. For glazing materials subject to damage during construction, protect from breakage by attachment of crossed streamers to framing. Do not mark on surfaces.
- B. Remove and replace broken, cracked, chipped or otherwise damaged glazing materials and materials not meeting specified design criteria prior to Date of Substantial Completion.
- C. Final cleaning: Just prior to Date of Substantial Completion, clean glass inside and out. Clean using pre-tested detergent and water. Flush with clean water. Repair or replace work which cannot be cleaned or which has been damaged during construction operations.

End of Section

SECTION 09 2900

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY:

- A. Related work:
1. Rough carpentry.
 2. Architectural woodwork.
 3. Acoustical ceilings.
 4. Painting and coating.
 5. Mechanical.
 6. Electrical.

1.2 SUBMITTALS:

- A. Product data: Indicate product description, including compliance with specified requirements and installation requirements. Include specific requirements for fire-rated and acoustically rated partitions. Mark manufacturer's brochures to include only those products proposed for use.
- B. Structural design calculations: Submit for Architect's information only. Indicate compliance with specified design criteria. Calculations shall bear the seal of a professional engineer licensed in the State of Georgia.

1.3 QUALITY ASSURANCE:

- A. Applicable standards; standards of the following:
1. American National Standards Institute (ANSI).
 2. ASTM International (ASTM) as referenced herein.
 3. Association of the Wall and Ceiling Industries - International (AWCI).
 4. Ceilings and Interior Systems Construction Association (CISCA).
 5. Gypsum Association (GA).
 6. Steel Stud Manufacturers Association (SSMA).
 7. Underwriters Laboratories, Inc. (UL).
 8. Intertek Testing Services/Warnock Hersey, Inc. (WHI).
 9. "Recommended Specification: Levels of Gypsum Board Finish" as published jointly by the Gypsum Association, AWCI, CISCA and PDCA.
 10. Painting and Decorating Contractors of America (PDCA).
- B. Design criteria:
1. Sound rating: Construct designated partitions in accord with manufacturer's product data, as submitted, for obtaining Sound Transmission Class (STC) ratings as indicated on drawings.
 2. Fire-resistance: Comply with fire-resistance designs indicated on drawings. Use only manufacturers and types of materials as required by indicated designs. Designs with tests by other than Testing Agency listed may be submitted for Architect's acceptance, subject to prior acceptance by governing authorities.
 3. Seismic performance: Comply with code requirements.

1.4 DELIVERY, STORAGE AND HANDLING:

- A. Delivery: Deliver materials in original packages, containers or bundles bearing brand name, applicable standard designation and name of manufacturer or supplier.
- B. Storage:
 - 1. Stack gypsum board inside building under roof, off floor on pallets or similar platforms providing continuous support for gypsum board and to prevent sagging. Stack gypsum board flat and so that long lengths are not over short lengths.
 - 2. Protect gypsum board from direct exposure to rain, snow, sunlight or other excessive weather conditions.
 - 3. Protect ready-mixed joint compounds against freezing, exposure to extreme heat and direct sunlight at all times.
 - 4. Do not overload floor systems.

1.5 PROJECT/SITE CONDITIONS:

- A. Install gypsum board only after building is enclosed.
- B. Environmental conditions:
 - 1. During mechanical application of gypsum board, maintain room temperature at not less than 40 degree F.
 - 2. During joint treatment and decoration, maintain room temperature not less than 50 degrees F for 48 hours prior to application and continuously thereafter until completely dry and until permanent heating system is in operation or building is occupied.
 - 3. When temporary heat source is used, temperature shall not exceed 95 degree F in any given room or area.
- C. Ventilation:
 - 1. Provide ventilation during and following joint treatment applications, and drying and curing periods.
 - 2. Use temporary air circulators in enclosed areas lacking natural ventilation.
 - 3. Under slow drying conditions, allow additional drying time between coats of joint treatment.
 - 4. Protect installed materials from drafts during hot, dry weather.
- D. When recommendations of manufacturer's product data exceed the above, comply with requirements of manufacturer's product data.

PART 2 - PRODUCTS

2.1 FRAMING MEMBERS:

- A. Gypsum board studs: Meeting requirements of ASTM C645-07; channel type, roll-formed from hot dip galvanized steel complying with ASTM A1003-05 and with ASTM C653-97(2007), G40 minimum.

1. Stud size: As indicated on drawings, except minimum 3-5/8" depth where partition is indicated to receive tile finish.
 2. Stud gauge: As required by manufacturer's product data for heights and conditions of use, with maximum allowable deflections as follows:
 - a. Ground floor lobbies: L/120 at 15 psf.
 - b. Partitions to receive tile finish: L/360 at 15 psf using 20 ga. or heavier studs.
 - c. All other partitions: L/240 at 5 psf.
 3. Comply with submitted design calculations.
- B. Floor and ceiling runners: Hot dip galvanized steel, 1" deep, minimum, by widths to receive studs, same gauge as studs. Runner tracks shall have slotted holes for attachment to structure and studs, for slip joints where required by manufacturer's product data.

2.2 GYPSUM BOARD:

- A. Regular board: Meeting ASTM C1396-06a (formerly ASTM C36), thickness indicated, tapered rounded edges.
- B. Fire-retardant board: Meeting ASTM C1396-06a (formerly ASTM C36), Type X, thickness indicated, tapered rounded edges.
- C. Moisture-resistant board: Meeting ASTM C1396-06a (formerly ASTM C630), thickness indicated, Regular and Type X Grade, tapered edges.
- D. Interior ceiling board: Meeting ASTM C1396-06a (formerly ASTM C1395), 1/2" thickness, Regular Grade, tapered edges.

2.3 TILE BACKER BOARD:

- A. Cementitious backer board: Meeting ASTM C1396-06a (formerly ASTM C1325) and ANSI A118.9-2005, minimum 7/16" thickness, water-resistant, non-combustible, fiber-reinforced cement boards, manufacturer's standard sizes.

2.4 SOUND CONTROL MATERIALS:

- A. Contractor's option: Based on sound ratings and fire-resistance ratings required for assemblies, Contractor may select glass fiber or mineral wool sound attenuation materials as follows:
 1. Glass fiber sound attenuation batts:
 - a. Acceptable products:
 - 1) CertainTeed Corp., Acousta-Therm Battts.
 - 2) Johns Manville Corp., Sound Shield.
 - 3) Owens-Corning Corp., Sound Attenuation Batt Insulation.
 - b. Characteristics:
 - 1) Type: Unfaced fiberglass batts for friction fit between studs, complying with ASTM C665-06, Type 1.
 - 2) Surface burning characteristics: Maximum 25 flame spread and 50 smoke development when tested in accord with ASTM E84-07.
 - 3) Assembly STC: As indicated on drawings.

- 4) Thickness: As indicated on drawings.
2. Mineral wool sound attenuation blankets:
 - a. Acceptable products; subject to compliance with specified requirements:
 - 1) Fibrex, Inc., Sound Attenuation Fire Batt Insulation.
 - 2) Owens-Corning Corp., Sound Attenuation Batt/MW.
 - 3) USG Interiors, Inc., Thermafiber Sound Attenuation Fire Blankets (SAFB).
 - b. Characteristics:
 - 1) Type: Paperless, semi-rigid mineral wool fiber blanket complying with ASTM C665-06, Type 1.
 - 2) Density: Maximum 4.0 pcf for 1" thickness, and maximum 2.5 pcf. for greater thicknesses.
 - 3) Surface burning characteristics: Maximum 15 flame spread and 5 smoke development when tested in accord with ASTM E84-07.
 - 4) Assembly STC: As indicated on drawings.
 - 5) Thickness: As indicated on drawings.
- B. Acoustical sealant: Non-hardening, non-skinning synthetic rubber, having a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Acoustical tape: Closed cell polyvinyl chloride foam tape, 1/4" thickness by 1" wide.

2.5 FASTENERS:

- A. Fasteners for metal framing, corrosion-resistant:
 1. For fastening framing members to concrete and masonry surfaces: Fasteners shall be beaded drive pins or threaded studs driven by powder actuated tools. Fasteners shall resist design loads in accord with requirements of NAAMM-ML/SFA 540-87.
 2. For fastening to metal decking and for fastening framing members together: Type S, pan head screws, in sizes recommended by gypsum board manufacturer for applications indicated.
 3. Provide slotted, stand-off washers for slip joint attachments.
- B. Screws for gypsum board and accessory application: Meeting ASTM C1002-04, corrosion-resistant.
 1. For application of single layer or base layer of gypsum board to metal framing: 1", Type S, bugle head.
 2. For application of face layer of gypsum board to metal framing in double layer construction: 1-5/8", Type S, bugle head.
 3. For gypsum board to gypsum board application: 1-1/2", Type G, bugle head.

- C. Screws for tile backer board application: Corrosion resistant sheet metal screws with head diameter providing 125 lb. fastener pull-through and pull-out resistance. Screw length shall provide 1/4" minimum thread engagement.

2.6 JOINT MATERIALS:

- A. Materials for standard gypsum board products:
 - 1. Joint tape: Meeting ASTM C475-02, perforated paper type.
 - 2. Joint compound: Meeting ASTM C475-02, ready-mixed tape embedment and topping compounds, vinyl-based, except that compounds for use with moisture-resistant gypsum board shall be chemically hardening type recommended by gypsum board manufacturer.
- B. Fiberglass tape for glass mat faced, moisture-resistant gypsum board: As herein specified.
- C. Tile backer board joint materials: Use same materials, as specified in Tiling section, for setting tile.

2.7 SUSPENDED GYPSUM BOARD FURRING SYSTEM:

- A. Acceptable manufacturers:
 - 1. Armstrong World Industries, Inc.
 - 2. Chicago Metallic Corp.
 - 3. USG Interiors, Inc.
- B. Characteristics:
 - 1. Structural classification: Meeting ASTM C635-04, Heavy Duty.
 - 2. Components: Fabricated from minimum 0.020" thickness, galvanized, cold-rolled steel; double web design.

2.8 ACCESSORIES:

- A. Accessories shall comply with ASTM C1047-05 and shall be as follows.
- B. Corner reinforcement: Galvanized steel with 1-1/4" wide fine expanded mesh flanges.
- C. Metal jamb, ceiling and casing trim: Manufacturer's standard "L" and "U" shaped galvanized members with fine expanded mesh flanges; "mud-in" type for finishing with joint compound.
- D. Control joints: Roll-formed galvanized steel.
- E. Furring channels: Minimum 25 ga. galvanized steel, 7/8" deep by 1-3/8" face width.
- F. "Z" furring channels: Minimum 25 ga. galvanized steel to receive 1" insulation.
- G. Ceiling hangers: Minimum eight ga. galvanized annealed steel wire.
- H. Tie wire: Minimum 18 ga. galvanized, annealed steel wire.

- I. Special trim shapes:
 1. Acceptable manufacturers; subject to compliance with specified requirements:
 - a. Fry Reglet Corp.
 - b. Gordon, Inc.
 - c. MM Systems Corp.
 2. Characteristics:
 - a. Material: Manufacturer's standard aluminum alloy.
 - b. Finish: Painted finish, color selected by Architect.
 - c. Shapes: As indicated on drawings.

PART 3 - EXECUTION

3.1 FRAMING INSTALLATION:

- A. Except where more stringent requirements are specified, install framing and furring in accord with ASTM C754-04, Gypsum Association requirements and manufacturer's product data.
- B. Runners:
 1. Attach runner tracks at floor and underside of structural deck with specified fasteners. Provide slip joint attachments to meet deflection criteria and manufacturer's calculations at the following locations:
 - a. Tall partitions.
 - b. Full-height, floor-to-floor or floor-to-deck partitions.
 - c. All partitions subject to deflection.
 2. Where partitions are indicated to stop at finish ceiling, attach to ceiling suspension system using 1/8" toggle bolts or sheet metal screws spaced at 1'-4" o. c., maximum, where partition aligns with ceiling grid. Where partition does not align with grid, attach at each intersection with grid.
- C. Studs:
 1. Position full length studs vertically, engaging floor and ceiling runners.
 - a. Space studs as indicated on drawings.
 - b. Space studs not to exceed 1'-4" o. c. for partitions to receive tile finish.
 2. Provide double studs at interior and exterior corners, expansion joints, partition termination and adjacent to door and borrowed lite openings in partitions. Locate next stud not more than 6" from double studs.
 3. Secure abutting and intersecting walls with fasteners through stud flanges.
 4. For horizontal reinforcement at door and borrowed lite frames, install cut-to-length runner sections with slit flanges secured to studs.
 5. Install acoustical tape on metal studs which abut other studs or dissimilar surfaces in walls to receive sound attenuation blankets.

3.2 SUSPENDED GYPSUM BOARD FURRING SYSTEM INSTALLATION:

- A. Install suspension system in accord with ASTM C754-04 and fire-rated design assemblies indicated.
- B. Seismic bracing: Comply with details and spacing indicated on drawings.
- C. Hangers:
 - 1. Space hangers at 4'-0" o. c., maximum, in each direction. Secure to building structure.
 - 2. Install additional hangers at ends of each suspension member and at each corner of lighting fixtures.
 - 3. Splay wires no more than 5" in 4'-0" vertical drop.
 - 4. Wrap wire minimum of three times horizontally, turning ends upward.
- D. Space main tees at 4'-0" o. c., perpendicular to structure. Space cross tees at 2'-0" o. c., perpendicular to main tees to form 2'-0" by 4'-0" grid system.
- E. Level and square suspension system within specified tolerances.
- F. Where grid system exists in an unrestrained condition, brace back to building structure using hanger wire, main tee or carrying channel braces spaced at 4'-0" o. c., maximum.

3.3 GENERAL BOARD APPLICATION:

- A. Except where more stringent requirements are specified, install gypsum board in accord with ASTM C840-07, GA-216 and manufacturer's product data.
- B. Use gypsum board of maximum lengths to minimize end joints. Stagger end joints.
- C. Abut gypsum boards without forcing. Fit ends and edges of board. Do not place butt ends against tapered edges.
- D. Support ends and edges of gypsum board panels on framing or furring members.
- E. Install gypsum board accessories in accord with gypsum board manufacturer's product data and as follows:
 - 1. Control joints: Install in walls and ceilings at locations shown, not exceeding 30'-0" o. c. Attach with staples to panel face. Where control joints occur in fire rated partitions, comply with code requirements and gypsum board manufacturer's product data.
 - 2. Corner bead: Install at external corners.
 - 3. Metal trim shapes: At exposed edge of gypsum board at door and window openings, at intersections with other materials and at intersection of walls with ceilings.
 - 4. Install corner beads and metal trim shapes to framing system with mechanical anchors.

- F. Install acoustical sealant at sound-rated partitions:
1. Seal partition perimeter with continuous 1/4" minimum round bead of acoustical sealant applied to each leg of runners, including those used at partition intersections with dissimilar wall construction.
 2. Install gypsum board with 1/8" perimeter relief compressing sealant to form permanent airtight seal.
 3. Where slip joint attachments are required at top of partition, fill resulting joint between drywall and adjacent structure with acoustical sealant to form permanent air tight seal.
 4. Apply acoustical sealant around cutouts such as at electrical boxes, plumbing penetrations, medicine cabinets, heating ducts and cold air returns to form permanent airtight seal. (Sealant shall not be used as a fire stopping material.)
- G. Install sound attenuation blankets at locations indicated on drawings. Comply with manufacturer's product data for installation. Attach flanges of blanket to web of stud and not to face of stud receiving gypsum board.
- H. Install cementitious backer board as a base for ceramic tile in accord with ANSI A108.11-2005.
- I. Install moisture-resistant board in locations indicated on drawings.
- J. For fire-rated and acoustically rated construction, comply with requirements of tested assemblies scheduled on the drawings.
- K. Continue all required components of fire-rated and acoustically rated wall assembly to overhead structure. Apply joint tape and one coat of compound to gypsum board joints concealed from view in completed work.
- L. Seal openings and penetrations in fire-rated construction as specified in Firestopping section.
- M. Identification:
1. Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other ** sub-ceiling or ** wall required to have protected openings shall be effectively and permanently identified with signs or stenciling in a manner acceptable to the Authority having Jurisdiction.
 2. Such identification shall be above any decorative ceiling and in concealed spaces.
 3. Suggested wording for fire and smoke barriers: "FIRE AND SMOKE BARRIER - PROTECT ALL OPENINGS."
- N. Allowable tolerances in finished ceilings:
1. Deflection: Suspension system components, hangers and fastening devices supporting lighting fixtures, ceiling grilles and acoustical units shall have maximum deflection of 1/360 of span when tested in accord with ASTM C635-04.
 2. Bow, camber and twist: Not exceeding tolerances established by ASTM C635-04.

3. Variation from level in finished ceiling: $\pm 1/8$ " in 12'-0".
 4. Variation in plane of adjacent gypsum board panels prior to joint treatment: $1/16$ ".
- O. Allowable tolerances in framed gypsum board construction.
1. Position: $\pm 1/4$ " maximum variation from design position.
 2. Alignment: $1/8$ " in 8'-0"; $1/4$ " maximum in any continuous wall, line or surface.
 3. Surface plane: $1/8$ " in 12'-0"; $1/16$ " in 1'-0", maximum variation in true surface plane.
 4. Surface smoothness: No joint or fastener location, roughness or blemish discernible after application of finish when viewed at any angle from a distance of 5'-0" under occupancy lighting conditions, with surface preparation as specified in Painting and Coating section.

3.4 SINGLE LAYER APPLICATION:

- A. Ceilings: Apply gypsum board with long dimension at right angles to framing. Terminate edges of gypsum board running parallel to framing on framing members.
- B. Walls:
1. Apply gypsum board vertically or horizontally at Contractor's option, except as required by gypsum board manufacturer's product data for system designs, including fire-rated and acoustically-rated partitions.
 2. Stagger end joints in opposite sides of partitions.
 3. Terminate edges of gypsum board running parallel to framing, furring on framing or furring members.
- C. Fastening: Attach gypsum board using fasteners specified at spacings required by manufacturer's product data.

3.5 DOUBLE LAYER APPLICATION:

- A. Base layer:
1. Ceilings: Apply base layer with long dimension at right angle to framing. Terminate edges of gypsum board running parallel to framing on framing members.
 2. Walls: Apply base layer vertically. Terminate edges of gypsum board running parallel to framing, furring on framing or furring members. Stagger vertical joints on opposite sides of partitions.
 3. Fastening: Attach gypsum board using fasteners specified, at spacings required by manufacturer's product data.
- B. Face layer:
1. Apply face layer at right angle to base layer with minimum 10" offset in parallel base and face layer joints.
 2. Fastening: Attach gypsum board using fasteners specified, at spacings required by manufacturer's product data.

3.6 JOINT TREATMENT:

- A. Finish Levels shall be in accord with the "Recommended Specification: Levels of Gypsum Board Finish" as published jointly by the Gypsum Association, AWCI, CISCA and PDCA.
- B. Finish Level 1; Joint treatment for non-public, non-service areas to receive no further finish, including storage areas: Apply joint compound to joints and angles in gypsum board and embed joint tape. Surfaces shall be free of excess joint compound; tool marks and ridges are acceptable.
- C. Finish Level 2; Joint treatment for areas indicated to receive no further finish, including unfinished service areas, mechanical and electrical rooms, janitors closets: Apply joint compound to joints, angles, fastener heads and accessories. Embed joint tape. Apply one additional coat of compound over tape. Apply one coat of compound to fastener depressions. Surfaces shall be free of excess joint compound; tool marks and ridges are acceptable.
- D. Finish Level 3; Joint treatment for areas indicated to receive tile finishes:
 - 1. Moisture-resistant board:
 - a. Apply joint compound to joints, angles, fastener heads and accessories. Embed joint tape. Apply two additional coats of compound over tape, featheredging and sanding each coat.
 - b. Apply minimum of two coats of compound to fastener depressions, sanding each coat and bringing to level plane with gypsum board surface.
 - 2. Cementitious backer board:
 - a. Prefill joints and joints where boards abut other panels or surfaces with material used to set tiles and then embed tape and level joints.
 - b. Caulk or seal penetrations and abutments to dissimilar materials.
 - 3. Finished joints shall be free of tool marks and ridges.
- E. Finish Level 4; Joint treatment for areas indicated to receive flat and eggshell paint finishes:
 - 1. Apply joint compound to joints, angles, fastener heads and accessories. Embed joint tape. Apply three additional coats of compound over tape, featheredging and sanding each coat.
 - 2. Apply minimum of three coats of compound to fastener depressions, sanding each coat and bringing to level plane with gypsum board surface.
 - 3. All joint compound shall be free of tool marks and ridges.
- F. Finish Level 5; Joint treatment for areas indicated to receive semi-gloss and gloss paint finishes and where severe lighting conditions occur:

1. Apply joint compound to joints, angles, fastener heads and accessories. Embed joint tape. Apply three additional coats of compound over tape, featheredging and sanding each coat.
 2. Apply minimum of three coats of compound to fastener depressions, sanding each coat and bringing to level plane with gypsum board surface.
 3. All joint compound shall be free of tool marks and ridges.
 4. Roll-apply a batter consistency skim coat mixture of gypsum board joint compound and water, or a material manufactured for this express purpose, to surfaces; smooth immediately with wide broadknife, without leaving tool marks, ridges or gouges in finished surface. Allow to dry prior to prime coat paint application.
- G. Fastener pop: Drive new fastener approximately 1-1/2" from popped fastener and repair to match gypsum board finish.
- H. Fill cracks with joint compound and sand smooth and flush.
- I. Dust surfaces and leave ready for decoration. Joint and fastener treatment shall be indistinguishable in finished work.

End of Section

SECTION 09 3000

TILING

PART 1 - GENERAL

1.1 SUBMITTALS:

- A. Shop drawings: Submit for tile pattern work indicated. Indicate control and expansion joint locations. Include tile layout, setting bed thicknesses, joint widths, control and expansion joint sizes and sections.
- B. Product data: Submit manufacturer's printed product description and installation instructions for each type of tile and for use of manufactured mortars, grouts, adhesives, sealants, latex/polymer additives, waterproof membrane, crack isolation membrane and accessory products. Include mortar and grout proportioning and mixing instructions for latex/polymer additives.
- C. Samples; submit the following:
 - 1. 1'-0" by 1'-0" panel of each type and color tile selected, grouted as specified.
 - 2. Samples of each trim shape required.
 - 3. 1'-0" length of threshold.
 - 4. Samples of each accessory required.
 - 5. Submit samples of standard color sealant materials for Architect's approval.
- D. Master grade certificates: Indicate that tile materials conform to ANSI A137.1-1988. Certificates shall indicate grade, kind of tile, identification for tile packages and name and location of project. Tile manufacturer shall issue certificates at time of shipping.
- E. Submit written certification that crack isolation membrane is approved for use with specified mortars.

1.2 QUALITY ASSURANCE:

- A. Applicable standards:
 - 1. Standards of the following, as referenced herein:
 - a. American National Standards Institute (ANSI).
 - b. ASTM International (ASTM).
 - c. Marble Institute of America (MIA).
 - 2. Tile Council of North America (TCNA), "Handbook for Ceramic Tile Installation," 2007 Edition.
- B. For each type of setting material and grouting material specified, only one brand shall be used throughout project.

1.3 DELIVERY, STORAGE AND HANDLING:

- A. Deliver materials in original containers with labels legible and intact, identifying brand name and contents.
 - 1. Tile cartons shall be grade-sealed by manufacturer in accord with ANSI A137.1-1988, with grade seals unbroken.

2. Manufactured mortars, adhesives and grouts shall bear hallmarks certifying compliance with specified standards.

1.4 JOB CONDITIONS:

A. Environmental requirements:

1. For field-mixed mortar and grout, set and grout tile when ambient temperature is at least 50°F. and rising.
2. For manufactured mortar, adhesive and grout, comply with minimum temperature recommendations of manufacturers.

1.5 WARRANTY:

- A. Warrant waterproof membrane from defects in materials and workmanship, including leakage, for a period of five years, beginning at Date of Substantial Completion. Form of warranty shall be as included in Division 00.

1.6 MAINTENANCE:

A. Extra materials:

1. Provide one carton of each type, size and color of tile specified and 5% of each type, size and color of accessory, for Owner's maintenance.
2. Store tile and accessory units where indicated by Owner.

PART 2 - PRODUCTS

2.1 TILE:

- A. The basis of design for each type of tile is as scheduled on drawings. Tile of similar characteristics, as manufactured by other acceptable manufacturers, may be submitted for Architect's acceptance. Acceptance is subject to compliance with specified requirements, as evidenced by specified submittals.
- B. Acceptable manufacturers; ceramic tile:
1. American Olean/Dal-Tile Co.
 2. Buchtal Corp., U.S.A.
 3. Dal-Tile Corp.
 4. Florida Tile Industries, Inc.
 5. Metropolitan Ceramics.
 6. United States Ceramic Tile Co.
- C. Acceptable manufacturers; porcelain tile:
1. American Marazzi Tile, Inc.
 2. American Olean/Dal-Tile Co.
 3. Buchtal Corp., U.S.A.
 4. Crossville Ceramics.
 5. Dal-Tile Corp.
 6. GranitiFiandre, Trans Ceramic Ltd.
 7. United States Ceramic Tile Co.

- D. Unglazed ceramic mosaic tile:
1. Meeting ANSI A137.1-1988, Section 5.1, Standard Grade, porcelain type, impervious, maximum absorption 0.5%.
 2. Color: Match colors scheduled on drawings.
 3. Nominal face size: As indicated on drawings.
 4. Thickness: Minimum 1/4".
 5. Mounting: Factory-mounted, permanent mesh, dot or net mounting with 1/16" wide joints. Back of tile shall achieve 80% minimum bond with setting material.
 6. Static coefficient of friction (COF) for floor tile, tested in accord with ASTM C1028-06 and meeting ANSI A137.1-1988 and recommendations of ADA Accessibility Guidelines:
 - a. Accessible routes: Minimum COF of 0.60.
 - b. Ramps: Minimum COF of 0.80.
- E. Porcelain tile:
1. Meeting ANSI A137.1-1988, Section 5.3, Standard Grade.
 2. Color: Match colors scheduled on drawings.
 3. Nominal face size: As scheduled on drawings.
 4. Thickness: Minimum 3/8".
 5. Finish: As scheduled on drawings.
 6. Static coefficient of friction (COF) for floor tile, tested in accord with ASTM C1028-06 and meeting ANSI A137.1-1988 and recommendations of ADA Accessibility Guidelines:
 - a. Accessible routes: Minimum COF of 0.60.
 - b. Ramps: Minimum COF of 0.80.
- F. Glazed wall tile:
1. Meeting ANSI A137.1-1988, Section 6.1, Standard Grade, non-vitreous; matte glazed.
 2. Color: Match colors scheduled on drawings.
 3. Nominal face size: As scheduled on drawings.
 4. Thickness: Minimum 1/4".
 5. Furnish tile with edge spacer lugs.
 6. Trim shapes: Match wall tile in color and size; for thinset application. Include coved base, bullnose caps, corner shapes and beads, as required.
- G. Accessories: Match wall tile in color and glaze; for thinset application. Include soap dishes without handles.

2.2 SETTING MATERIALS AND ACCESSORIES:

- A. Portland cement mortar:
1. Materials:
 - a. Portland cement: Meeting ASTM C150-07, Type I.
 - b. Sand: Meeting ASTM C144-04, clean and graded.
 - c. Water: Clean, potable.
 - d. Latex/polymer additives: As specified herein.
 - e. Mortar bed reinforcement: Welded wire mesh meeting ASTM A182-06 and ASTM A185-06e1, 2" by 2" by 16/16 wire.
 - f. Metal lath: Flat expanded lath, meeting ASTM C847-06, rust-resistant-painted, minimum weight of 2.5 lbs./sq. yd.
 2. Proportions: Mix materials in accord with specified standards.

- B. Dry-set Portland cement mortar for floor tile with all dimensions less than 8":
 - 1. Acceptable products:
 - a. Bonsal American, Superior Permaset Series 400.
 - b. Bostik, Tile-Mate Premium.
 - c. Custom Building Products, Flexbond Premium Flexible Bonding Mortar.
 - d. Mapei Corp., Kerabond with undiluted Keralastic Additive.
 - 2. Characteristics: Pre-sanded, latex/polymer-modified or polymer-modified Portland cement and additives meeting ANSI A118.1-2005 for floors; mixed with specified additives.

- C. Medium bed latex Portland cement mortar for floor tile with any dimension 8" or larger:
 - 1. Acceptable products:
 - a. Bonsal American, Medium Bed Permaflex - Series 550.
 - b. Bostik, Big Tile & Stone Mortar.
 - c. Custom Building Products, Marble and Granite Mortar Mix.
 - d. Mapei Corp., Ultralite Mortar.
 - 2. Characteristics: Pre-sanded, latex/polymer-modified Portland cement and additives meeting ANSI A118.1-2005 and A118.4 for floors; mixed with specified latex/polymer additive.

- D. Dry-set Portland cement mortar for walls:
 - 1. Acceptable products:
 - a. Bonsal American, Superior Permaset - Series 400.
 - b. Bostik, Tile-Mate Premium.
 - c. Custom Building Products: Megalite.
 - d. Mapei Corp., Kerabond/Keralastic System.
 - 2. Characteristics: Pre-sanded, latex/polymer-modified or polymer-modified Portland cement and additives meeting ANSI A118.1-2005 for walls; mixed with specified additives.

- E. Membrane waterproofing:
 - 1. Acceptable product:
 - a. The Noble Co., Chloraloy.
 - b. Compotite Corporation, Blue Vinyl 40.
 - 2. Characteristics: Minimum 40 mil thickness chlorinated polyethylene or PVC sheet.
 - 3. Provide manufacturer's standard solvents, adhesives and accessories as required for complete installation with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- F. Crack isolation membrane:
 - 1. Acceptable products:
 - a. Compotite Corporation, Composeal Gold.
 - b. NAC Products, Inc., ECB Membrane.
 - c. The Noble Co., Noble Seal CIS.
 - d. Terraflow Systems, Inc., Terraflow Anti-Fracture Membrane System.

2. Characteristics:
 - a. Material: Minimum 30 mil thickness chlorinated polyethylene or PVC sheet with fabric-reinforced facing.
 - b. Primer, adhesive and accessories: As recommended by membrane manufacturer's product data with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.3 GROUTING MATERIALS:

- A. Polymer modified unsanded cement grout for wall tile:
 1. Acceptable products:
 - a. Bonsal American, Polymer Modified Unsanded Tile Grout.
 - b. Bostik, Hydroment Dry Tile Grout (Unsanded) with undiluted #425 Hydroment Multi-Purpose Acrylic Latex Admixture.
 - c. Custom Building Products: Polyblend Non-Sanded Grout.
 - d. Mapei Corp., Keracolor U.
 2. Characteristics: Latex/polymer-modified or polymer-modified Portland cement with additives, colors as selected by Architect from manufacturer's standard selection; meeting ANSI A118.6-2005 and ANSI A118.7-2005.
- B. Chemical-resistant epoxy grout:
 1. Acceptable products:
 - a. Bonsal American, B-7000 Epoxy.
 - b. Bostik Findley, Color-Poxy.
 - c. Custom Building Products: 100% Solids Epoxy Grout.
 - d. Mapei Corp.: Kerapoxy.
 2. Characteristics: 100% epoxy, two-part or three-part composition meeting ANSI A118.3-2005; TCNA licensed for acid and alkali resistance; with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24); colors selected by Architect from manufacturer's standard selection.

2.4 ADDITIVES:

- A. Latex/polymer additives as herein specified: Undiluted type for field mixing. Additives shall be manufactured or approved in writing by mortar and grout manufacturers.
- B. Additives for thickset mortar beds; acceptable products:
 1. Bonsal American, Bonsal B-730 Grout/Mortar Additive.
 2. Bostik Findley: #425 Multi-Purpose Acrylic Latex Admixture.
 3. Custom Building Products: CustomFlex Ultra-Strength Thin-Set Additive.
 4. Mapei Corp.: Keraply.
- C. Add specified additives to specified mortars and grouts.
 1. For Portland cement mortar and grout, comply with additive manufacturer's product data for proportions and mixing instructions.

2. For manufactured mortars and grouts, comply with mortar and grout manufacturers' product data for additive proportions and mixing instructions.

2.5 CONTROL AND EXPANSION JOINT MATERIALS:

- A. Acceptable products:
 1. Pecora Corp., Dynatrol II.
 2. BASF Building Systems, NP-2.
 3. Tremco, Inc., Dymeric.
- B. Characteristics:
 1. Type: Two-part, polyurethane-based sealant with separate pre-packaged color agent; VOC Content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Colors: As selected by Architect from manufacturer's standard selection.
- C. Primer: Type recommended by sealant manufacturer.
- D. Backup material: Flexible, non-compressive foam type as recommended by sealant manufacturer.

2.6 ACCESSORY MATERIALS:

- A. Marble thresholds: Meeting MIA Group A, honed finish, in sizes and shapes indicated; color selected by Architect.
- B. Edge strips: Stainless steel, 1/8" wide with provisions for anchoring to concrete slab.
- C. Cleaning materials and methods for face of epoxy-grouted tile: Provide grout cleaning materials and methods in accord with manufacturer's product data.

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Conditions of surfaces to receive tile:
 1. Surfaces shall be firm, dry, clean and free of oily or waxy films.
 2. Grounds, anchors, plugs, hangers, bucks, electrical and mechanical work in or behind tile shall be installed prior to proceeding with tile work.
- B. Perform bond and moisture tests on subfloors in accord with ASTM F2170-02 and adhesive and mortar manufacturer's product data, to determine if surfaces are acceptable to receive specified adhesive and mortar products. Correct conditions detrimental to adhesive and mortar installation prior to starting installation.

3.2 GENERAL TILE INSTALLATION:

- A. Install tile in accord with ANSI A108.1-2005 through A108.11-2005 and as specified herein.

B. Layout:

1. Center tile within areas to avoid tiles of unequal widths at opposite walls and tiles of less than 1/2 tile width.
2. Align tile joints straight and parallel to walls.
3. Align joints in floor and base or wall tile.
4. Locate accessories, control joints and expansion joints before installing tile.

C. Cutting and fitting:

1. Cut and drill tiles without damaging exposed tile face. Rub cut edges smooth with Carborundum stone.
2. Grind and fit tile at intersections, against trim and at built-in fixtures and accessories.
3. Fit tile around outlets, pipes, fixtures and fittings so that tile edges are concealed under applied escutcheons, collars or plates.
4. Miter coved and bullnose tile in corners or use special trim shapes to maintain uniform joint widths.

D. Joints:

1. Provide uniform joint widths equal to pre-spaced tile for ceramic mosaic tile and glazed wall tile.
2. Provide 3/8" wide joints for porcelain tile.
3. In internal vertical corners of wall tile and where tile abuts dissimilar materials, form joints using control joint filled with sealant in lieu of grout.

E. Control and expansion joints:

1. Ascertain that control and expansion joints are located in accord with approved shop drawings, TCNA EJ171-07, and as approved in advance by Architect.
2. Provide control joints, perimeter control joints and expansion joints through tile and setting bed.
 - a. Field of floor control joints shall be located as follows:
 - 1) Spacing indicated, but not less than 20'-0" to 25'-0" o. c. in each direction.
 - 2) Over cold joints and saw-cut control joints.
 - b. Provide control joints at all perimeters.
 - c. Locations of all joints shall be as approved in advance by Architect. Width of joints shall match width of grout joints, except control joint shall be not less than 1/8" wide.
3. Prime joints in accord with sealant manufacturer's product data. Following tile work completion, seal joints in accord with TCNA EJ171-07, using specified sealant.

F. Thresholds:

1. Marble: Install in accord with TCNA TR611-07. Seal joint between threshold and tile using sealant in lieu of grout.
2. Edge strips: Install at door openings not having thresholds and at intersections with other flooring materials where thresholds are not indicated.

- G. Allowable site tolerances: Plumb, level and true to line within $\pm 1/4$ " in an undivided space and $\pm 1/16$ " maximum in a running foot.
- H. Membrane waterproofing:
 - 1. Install in accord with manufacturer's product data. Turn up material at curbs and walls. Make joints and seams watertight, as recommended by manufacturer's product data.
 - 2. Perform water test just prior to setting bed installation. Check for leaks at seams and drains. Begin no setting bed installation until shower pans are watertight.
- I. Install crack isolation membrane at joints and cracks in concrete floors. Install in accord with manufacturer's product data.

3.3 TILE INSTALLATION:

- A. Floor tile and pavers with any dimension 8" or larger, medium bed set, interior:
 - 1. Setting method: Medium-bed latex Portland cement mortar over bonded crack isolation membrane.
 - 2. Standard installation method: Generally in accord with TCNA F125-07.
 - 3. Grout type: Chemical resistant epoxy grout.
- B. Floor tile and pavers with all dimensions less than 8", thinset, interior:
 - 1. Setting method: Dry-set or latex Portland cement mortar over bonded crack isolation membrane.
 - 2. Standard installation method: TCNA F125-07.
 - 3. Grout type: Chemical resistant epoxy grout.
- C. Wall tile and base, thinset over masonry, interior:
 - 1. Setting method: Dry-set mortar or latex Portland cement mortar bond coat.
 - 2. Standard installation method: TCNA W202-07.
 - 3. Grout type: Polymer modified unsanded cement grout.
- D. Wall tile and base, thinset over solid backing, interior:
 - 1. Setting method: Dry-set or latex Portland cement mortar bond coat.
 - 2. Standard installation method: TCNA W243-07.
 - 3. Grout type: Polymer modified unsanded cement grout.
- E. Wall tile and base, thinset over cementitious backer board, interior:
 - 1. Setting method: Dry-set mortar on cementitious backer board over studs.
 - 2. Standard installation method: TCNA W244-07.
 - 3. Grout type: Polymer modified unsanded cement grout.

- F. Shower floors and curbs thickset, and shower walls, thinset, over cementitious backer unit:
1. Setting methods:
 - a. Floors:
 - 1) Setting bed: Portland cement paste (bond coat) over plastic or dry-set or latex Portland cement mortar over cured 1" to 1-3/4" thickness Portland cement bed. Place bed over waterproof membrane and install bed reinforcement. Turn membrane up a minimum of 3" above curb.
 - 2) Standard installation method: TCNA B415-07.
 - b. Curbs:
 - 1) Setting bed: Portland cement paste (bond coat) over plastic or dry-set or latex Portland cement mortar over cured 1" to 1-3/4" thickness Portland cement bed. Place bed over membrane waterproofing and install metal lath reinforcement. Turn membrane up a minimum of 3" above curb.
 - 2) Standard installation method: TCNA B417-07.
 - 3) Sealant: Bath sealant as specified in Joint Sealants section.
 - c. Walls:
 - 1) Setting bed: Dry-set mortar.
 - 2) Waterproof membrane: Turn membrane a minimum of 6" up wall, behind cementitious backer unit.
 - 3) Standard installation method: TCNA W244-07.
 2. Grout type: Chemical resistant epoxy grout.

3.4 CLEANING AND PROTECTION:

- A. Clean tile as work progresses, preventing accumulation of setting and grouting materials or debris on tile faces.
- B. Immediately remove excess grout from faces of epoxy-grouted tile; comply with grout manufacturer's product data.
- C. Thresholds and glazed tile: Clean thresholds and glazed tile using a solution of detergent and water only. Use no acids to clean thresholds and glazed tile.
- D. Unglazed tile:
 1. Allow tile work to cure a minimum of 14 days prior to acid cleaning.
 2. Saturate grout joints with clean water at least two hours prior to beginning acid cleaning. Apply a grease coating to metal and vitreous surfaces subject to contact with acid solution.
 3. Utilize a solution of one pound sulfamic acid to five gallons clean water for cleaning in accord with ANSI A137.1-1988, Section 3.5.3. Work in areas not exceeding 20 sq. ft., scrubbing tile surfaces to remove residue. Do not scrub grout joints.

4. Flush cleaned areas with water immediately after cleaning. Scrub surfaces with clean water to remove remaining film.
 5. Do not reuse cleaning solutions. Discard solutions containing residue and debris from cleaning operations so as not to contaminate or stain adjacent work.
- E. Protection: Protect installed tile work until Date of Substantial Completion by covering with kraft paper.

End of Section

SECTION 09 5100
ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY:

- A. Related work specified elsewhere:
1. Gypsum board.
 2. Hanger inserts.

1.2 SUBMITTALS:

- A. Shop drawings; include the following:
1. Layout, including locations of lighting fixtures and grilles.
 2. Insert and hanger spacing and fastening details.
 3. Splicing method for main and cross runners.
 4. Change in level details.
 5. ** Access panel dimensions and locations. **
 6. Support requirements for lighting fixtures, grilles and similar items.
- B. Product data: Include product descriptions and installation instructions for each material. Indicate load carrying capacity of suspension system hanger spacings and manufacturer's recommended methods for fixture support.
- C. Samples; submit the following:
1. 1'-0" by 1'-0" samples of each type and color acoustical material.
 2. Samples of each type and color suspension member and accessory.
- D. Certificates: Indicate compliance with specified requirements, including seismic requirements and UL fire-resistive ratings.

1.3 QUALITY ASSURANCE:

- A. Applicable standards; standards as referenced herein:
1. American Iron and Steel Institute (AISI).
 2. ASTM International (ASTM).
 3. Ceiling & Interior Systems Contractors Association (CISCA).
 4. Underwriters Laboratories, Inc. (UL).
 5. United States Department of Agriculture (USDA).
- B. Obtain acoustical panels and supporting suspension system through one source from a single manufacturer. Each type of acoustical panel and painted grid shall be from a single production run.
- C. Seismic performance: Comply with code requirements.

1.4 PROJECT/SITE CONDITIONS:

- A. Sequencing and scheduling: Schedule acoustical material installation to minimize need for removal and replacement of acoustical units to accommodate work of other trades.

PART 2 - PRODUCTS

2.1 STEEL SUSPENSION SYSTEMS:

- A. Acceptable manufacturers; subject to compliance with specified requirements:
1. Armstrong World Industries, Inc.
 2. BPB America, Inc., Celotex Brand.
 3. Chicago Metallic Corp.
 4. USG Interiors, Inc.
- B. Exposed steel grid system; 15/16" flange face.
1. Structural classification: Meeting ASTM C635-04, Intermediate Duty.
 2. Module: 2'-0" by 2'-0".
 3. Main and cross tees:
 - a. Tee material: Hot dip galvanized, cold-rolled steel.
 - b. Cap material: Hot dip galvanized, cold-rolled steel.
 - c. Design: Double web.
 - d. Tee size: 15/16" flange face width; 1-1/2" nominal height main tees.
 - 1) 2'-0" or 4'-0" long cross tees.
 - 2) Material thicknesses shall be as required to meet specified structural classifications.
 4. Edge molding: Minimum 0.020" thickness galvanized steel, channel or angle shaped with minimum 3/4" flange width, hemmed edge.
 5. Finish on exposed components: Chemically treated for paint adhesion with factory-applied, low-gloss white paint.
- C. Accessories:
1. Hold-down clips: Suspension system manufacturer's standard design compatible with ceiling panels specified.
 2. Hanger wire: Minimum 12 ga., galvanized, soft-annealed, mild steel wire.
 3. Wire ties: 18 ga., galvanized, annealed steel wire.
 4. Hanger clips: Prefabricated metal clamps for fastening to building structure.
 5. Carrying channels: 16 ga. cold-rolled steel, 1-1/2" deep.
 6. Special shapes:
 - a. Acceptable manufacturers; subject to compliance with specified requirements:
 - 1) Fry Reglet Corp.
 - 2) Gordon, Inc.
 - 3) Pittcon Industries.
 - b. Characteristics: Aluminum acoustical moldings, shapes as indicated; white color.

2.2 ACOUSTICAL CEILING PANELS:

- A. Acceptable manufacturers; subject to compliance with specified requirements:
 - 1. Basis of design: Armstrong World Industries, Inc., Cortega.
 - 2. CertainTeed Corp., Baroque.
 - 3. USG Interiors, Inc., Omni.
- B. Characteristics:
 - 1. Size: 2'-0" by 2'-0".
 - 2. Thickness: 5/8".
 - 3. Edges: Reveal (tegular).
 - 4. Finish: Factory-applied, washable paint.

2.3 ACCESSORIES:

- A. Acoustical sealant:
 - 1. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 - 2. Acoustical Sealant for Concealed Joints: Manufacturer's standard nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), recommended for sealing interior concealed joints to reduce airborne sound transmission.
- B. Sound attenuation blankets: 1-1/2" thickness, minimum 2-1/2 lb. density, paperless, semi-rigid, mineral fiber blanket.
- C. T-Grid support clip:
 - 1. Acceptable products:
 - a. Armstrong World Industries, Inc., Beam End Retainer Clip Item 7395.
 - b. Chicago Metallic corp., Perimeter clip 1499.
 - c. Erico Products, Inc., Caddy TGE T-Grid support clip.
 - d. USG Industries, Inc., Mac 2.
 - 2. Characteristics: Mechanical clip for attaching acoustical "T" to edge molding without exposed fasteners in grid system.

PART 3 - EXECUTION

3.1 JOB MOCK-UP:

- A. Install complete ceiling of each type specified, in space designated by Architect. Notify Architect when spaces are ready for observation.

- B. Following Architect's acceptance, retain mock-up as a standard of quality for ceiling installation. Accepted mock-up may remain as part of finished work.

3.2 SUSPENSION SYSTEM INSTALLATION:

- A. Install suspension system in accord with manufacturer's product data, ASTM C636-06, ASTM E580-06 and CISCA recommendations, except for more stringent requirements specified herein.
- B. Layout:
1. Center grid system within areas to avoid panels of unequal widths at opposite walls and panels of less than 1/2 width.
 2. Align grid members straight and perpendicular to walls.
 3. Locate accessories, control joints and expansion joints before installing grid system.
- C. Seismic requirements:
1. Comply with building code for seismic restraint requirements.
 2. Install suspension systems in accord with ASTM E580-06.
 3. Seismic bracing: In addition to complying with ASTM C636-06 and ASTM E580-06, install suspension systems in accord with CISCA 0-2 and applicable building code requirements.
- D. Hangers:
1. Space hangers for main tees at 4'-0" o. c. maximum. Secure to building structure.
 2. Install additional hangers at ends of each suspension member, within 6" of end of member or wall.
 3. Install additional hangers within 6" of each corner of lighting fixtures, grilles and similar items.
 4. Splay wires no more than 5" in 2'-6" vertical drop.
 5. Where spacing of hangers for main tees exceeds maximum specified spacing due to interference by adjacent construction, indirect-hang tees using carrying channels to maintain maximum hanger spacing.
 6. Wrap wire minimum of three times horizontally, turning ends upwards.
- E. Direct-hung, exposed grid system, 2'-0" by 2'-0" module:
1. Space main tees at 4'-0" o. c., maximum, perpendicular to structure.
 2. Locate cross tees at 2'-0" o. c., perpendicular to main tees.
 3. Space cross tees at 2'-0" o. c., perpendicular to previously installed cross tees, to form 2'-0" by 2'-0" grid module. Connect to cross tees through slots in main tees.
- F. Level and square suspension system components within specified tolerances prior to beginning ceiling material installation.

- G. Install cross tees adjacent to lighting fixtures and grilles on each side not supported by main tees. Support no fixtures on main or cross tees when fixture weight results in dead load exceeding deflection capacity of suspension system.
- H. Where cut tees intersect other tees or edge moldings without mechanical attachment, attach components using T-Grid support clip. At contractor's option tees may be attached directly to partition with tie wire.
- I. Wall moldings:
 - 1. Install wall molding at intersection of suspended ceiling and vertical surfaces.
 - 2. Miter corners where wall moldings intersect or install corner caps.
 - 3. Attach to vertical surfaces with mechanical fasteners.
 - 4. Apply continuous ribbon of acoustical sealant on vertical web.
- J. Where grid system exists in an unrestrained condition, brace back to building structure using hanger wire, main tee or carrying channel braces spaced at 4'-0" o. c., maximum.

3.3 ACOUSTICAL UNIT INSTALLATION:

- A. Install acoustical units in level plane, in straight line courses, within specified tolerances.
- B. Place acoustical materials to bear all around on suspension members.
- C. Pattern shall be symmetrical about centerline of area, unless otherwise indicated. Lay out units having directional pattern in same direction.
- D. Seal joints in acoustical units around pipes, ducts, and ducts and electrical outlets with acoustical sealant.
- E. Where cutting of acoustical units is required, cut so that no cut or damaged edges are visible in finished work.
- F. Hold-down clips: Install acoustical units surrounding recessed troffer lights with hold-down clips to prevent movement or displacement of units.
- G. Lay sound attenuation blankets over ceilings in designated spaces.
- H. Allowable tolerances:
 - 1. Deflection: Suspension system components, hangers and fastening devices supporting lighting fixtures, ceiling grilles and acoustical units shall have maximum deflection of 1/360 of the span when tested in accord with ASTM C635-04.
 - 2. Bow, camber and twist: Not exceeding tolerances established by C635-04.
 - 3. Variation from level in finished ceiling: $\pm 1/8$ " in 12'-0".

3.4 MAINTENANCE MATERIALS:

- A. Furnish extra materials equal to one percent of each type of acoustical material supplied.
- B. Furnish suspension system components in amount sufficient to install extra ceiling units.

3.5 CLEANING:

- A. Clean soiled or discolored unit surfaces after installation.
- B. Touch up scratches, abrasions, voids and other defects in painted metal surfaces.
- C. Remove and replace damaged and stained acoustical units with new units.

End of Section

SECTION 09 6500
RESILIENT FLOORING

PART 1 - GENERAL

1.1 SUBMITTALS:

- A. Product data: Indicate product characteristics and installation requirements, including manufacturer's recommended adhesives and maintenance instructions.
- B. Samples: Submit full size samples for each type color and pattern of flooring and accessory required.

1.2 QUALITY ASSURANCE:

- A. Applicable standards, as referenced herein: ASTM International (ASTM).

1.3 PROJECT/SITE CONDITIONS:

- A. Environmental requirements:
 - 1. Maintain temperature in space to receive resilient materials at not less than 70°F. for not less than 24 hours before, during and for 48 hours after installation.
 - 2. Maintain minimum temperature of 55°F. after flooring is installed, except as specified above, for duration of project.
- B. Protection: Protect finished flooring, base and accessories from staining, marring or other physical damage by work of other trades. Cover or mask surfaces as required.

PART 2 - PRODUCTS

2.1 VINYL COMPOSITION TILE:

- A. Acceptable manufacturers:
 - 1. Armstrong World Industries, Inc.
 - 2. Mannington Commercial.
 - 3. Tarkett, Inc.
- B. Type: Armstrong Excelon, Imperial Series, or similar of other acceptable manufacturers meeting ASTM F1066-04, Class 2 for through pattern tile.
- C. Size: 1'-0" by 1'-0" face size by 1/8" thickness.
- D. Colors: As selected by Architect from manufacturer's standard colors.

2.2 RUBBER BASE:

- A. Acceptable manufacturers:
 - 1. Allstate Rubber Corp.
 - 2. Burke Mercer Flooring Products, a Div. of Burke Industries.

3. Roppe Corp.

B. Characteristics:

1. Type: Minimum 48% rubber, 100% vulcanized; meeting ASTM F1861-02, Type TS Thermoset Vulcanized Rubber SBR.
2. Length: Minimum 120'-0" rolls.
3. Thickness: 1/8".
4. Height: 4".
5. Style: Straight and coved as indicated.
6. Colors: As selected by Architect from manufacturer's standard selection.

- C. Corners: Preformed inside and outside corners. Preformed corners shall match base in color, sheen and overall appearance.

2.3 ACCESSORIES:

A. Acceptable manufacturers:

1. Burke Mercer Flooring Products, a Div. of Burke Industries.
2. Marley Flexco (USA), Inc.
3. Johnsonite, Inc.
4. R. C. Musson Rubber Co.
5. Roppe Corp.

B. Reducers:

1. Material: Vinyl.
2. Thickness: Same as abutting floor materials.
3. Width: 1".
4. Edges: Tapered.
5. Colors: As selected by Architect from manufacturer's standard colors.

2.4 INSTALLATION MATERIALS:

A. Leveling compound; acceptable products:

1. Custom Building Products, LevelQuik RS.
2. Euclid Chemical Co., Floorstone with Latex Liquid.
3. Mapei, PLANI/PATCH.

B. Adhesives:

1. Water-resistant types and brands of solvent-free adhesive recommended by flooring material manufacturer's product data for installation conditions indicated.
2. VOC Content: Comply with the following limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. VCT Adhesives: Not more than 50 g/L.
 - b. Cove Base Adhesives: Not more than 50 g/L.

- C. Buffing compound: Types recommended by floor covering manufacturer for the particular type of flooring material.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Prepare surfaces to receive resilient material in accord with flooring manufacturer's instructions.
- B. Grind high areas and fill depressions with leveling compound where required to produce smooth installation and for proper alignment of carpet with adjacent flooring materials.
- C. Perform bond and moisture tests on subfloors in accord with ASTM F2170-02 and resilient flooring manufacturer's product data, to determine if surfaces are acceptable to receive specified resilient flooring products. Correct conditions detrimental to resilient flooring installation prior to starting installation.
- D. Remove dirt, oil, grease or other foreign matter from surfaces to receive floor covering or accessories.

3.2 APPLICATION OF ADHESIVES:

- A. Mix and apply adhesives in accord with resilient material manufacturer's product data. Apply with notched trowel or other tools as recommended by adhesive manufacturer.
- B. Provide safety precautions during mixing and applications as recommended by adhesive manufacturer.
- C. Apply adhesive to only that area which can be covered by resilient material within the recommended working time of the adhesive.
 - 1. Remove adhesive which dries or films over.
 - 2. Do not soil walls, bases or adjacent areas with adhesives.
 - 3. Remove spilled or misplaced materials.

3.3 TILE INSTALLATION:

- A. Lay tile in accord with resilient tile manufacturer's product data.
- B. Lay tile beginning at center of room or space, working toward perimeter.
 - 1. Adjust starting point as necessary to provide border tile widths equal to or greater than a half width tile.
 - 2. Joints between tile shall be fitted without gap; butted together.
 - 3. Cut border tile to fit within 1/32" of abutting surfaces.
- C. Fit flooring material into breaks and recesses, against bases, around pipes and penetrations, under saddles or thresholds and around permanent cabinets and equipment.
- D. Lay tile with grain or pattern running in same direction as adjacent tiles.

3.4 INSTALLATION OF BASE:

- A. Workmanship:
 - 1. Unroll base material and allow to relax for 24 hours, minimum, prior to installation. Cut into lengths for minimum number of joints. Double-cut adjoining lengths.
 - 2. Install with tight butt joints with no joint widths greater than 1/64".
- B. Top-set base:
 - 1. Apply adhesive and adhere to vertical surfaces.
 - 2. Press down so that bottom edge follows floor profile.
 - 3. Form internal corners using premolded corners.
 - 4. Form external corners using premolded corners.
 - 5. Scribe base to abutting materials.

3.5 ACCESSORY INSTALLATION:

- A. Cut materials to lengths and sizes indicated.
- B. Resilient reducers:
 - 1. Apply adhesives and bond to substrate.
 - 2. Center reducers in door openings.
 - 3. Fit edge to door frame jambs without visible gaps or cracks.
 - 4. Fit edges to abutting floor materials for flush fit.

3.6 CLEANING:

- A. Upon completion of installation, clean surfaces using a neutral cleaner acceptable to material manufacturer.
- B. Just prior to Date of Substantial Completion, buff no-wax floors using buffing compound for no-wax finish.

3.7 MAINTENANCE MATERIAL:

- A. Furnish additional floor tile of each color and pattern of tile as maintenance material. Furnish at the rate of one carton for each 1000 sq. ft. of floor surface or fraction thereof.
- B. Salvage scraps from installation of sheet flooring goods over three sq. ft. in area and over 1'-0" in width for Owner's use.

End of Section

SECTION 09 6800

CARPETING

PART 1 - GENERAL

1.1 SUBMITTALS:

- A. Shop drawings: Submit layout and seaming drawings. Submit shop drawings for line marking colors, patterns and locations for athletic carpet.
- B. Product data: Submit for carpet tile and installation accessories. Include test reports verifying that carpet tile meets specified design criteria. Include manufacturer's specification data and installation procedures. Indicate primers, adhesives and seaming methods proposed for use. Should carpet manufacturer not publish detailed installation data, installer shall submit detailed proposed procedures for Architect's approval.
- C. Maintenance data: Submit as part of Contract closeout documents. Include recommendations for various traffic conditions, cleaning procedures and intervals.
- D. Samples; identify carpet samples by name, number and manufacturer's lot number:
 - 1. Carpet tile: Submit two full-size samples of each type, color and pattern selected.
 - 2. Accessories: Submit 1'-0" length of carpet edge strip.
- E. Certificates: Carpet shall be certified for compliance with specification requirements. Submit certificates from carpet manufacturer at time of carpet delivery to project site. Each certificate shall be signed by authorized officer of carpet manufacturing company and shall contain the name and address of the Contractor, the project location and the quantities and date or dates of shipment or delivery to which certificates apply.

1.2 SYSTEM DESCRIPTION:

- A. Design criteria; carpet tile shall meet the following:
 - 1. Smoke development: Less than 450 when tested in accord with NFPA 258.
 - 2. Critical radiant flux: Class I, 0.45 watts/cm² when tested in accord with ASTM E648-06a.
 - 3. Electrostatic propensity: Less than 3000 volts when tested in accord with AATCC 134.
 - 4. Flammability of carpet: Pass methanamine pill test when tested in accord with ASTM D2859-04.
- B. Emissions compliance:
 - 1. Carpet: Emissions shall not exceed the following limits when tested in accord with ASTM D5116-06 and shall be in compliance with CRI Indoor Air Testing Program and shall bear CRI Label.
 - a. Total volatile organic compounds (VOCs): Maximum 0.5 mg per square meter per hour.

- b. Formaldehyde: 0.05 mg per square meter per hour.
- c. 4-PC (4-Phenylcyclohexane): 0.05 mg per square meter per hour.
- d. Styrene: 0.4 mg per square meter per hour.
- 2. Adhesive: Emissions shall not exceed the following limits when tested in accord with ASTM D5116-06 and shall be in compliance with CRI Indoor Air Testing Program and shall bear CRI Label.
 - a. Total volatile organic compounds (VOCs): Maximum 10.0 mg per square meter per hour.
 - b. Formaldehyde: 0.05 mg per square meter per hour.
 - c. 2-Ethyl-1-Hexanol: 3.0 mg per square meter per hour.

1.3 QUALITY ASSURANCE:

- A. Applicable standards; standards of the following, as referenced herein:
 - 1. American Association of Textile Chemists and Colorists (AATCC).
 - 2. ASTM International (ASTM).
 - 3. Department of Commerce (DOC).
 - 4. National Fire Protection Association (NFPA).
 - 5. The Carpet and Rug Institute (CRI).

1.4 DELIVERY, STORAGE AND HANDLING:

- A. Deliver materials in manufacturer's original mill wrappings, with carpet having register tag number attached. Deliver only after building is enclosed and spaces have controlled temperature and humidity.
- B. Store materials under cover, off floor, in ventilated space. Protect from damage, staining and moisture. Stand no roll material on end.

1.5 PROJECT/SITE CONDITIONS:

- A. Provide fresh air ventilation during entire installation process and for 72 hours afterwards.

1.6 WARRANTIES:

- A. Carpet tile warranty: Provide manufacturer's standard warranty for carpet tile stating that tile will remain dimensionally stable, colorfast and static-resistant and will not lose more than 15% by weight of face yarn, will not edge ravel or separate. Warranty period shall be 15 years, beginning at Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE:

- A. Acceptable manufacturers; subject to compliance with specified requirements:
 - 1. Collins and Aikman Floor Coverings.
 - 2. Interface Flooring Systems, Inc.
 - 3. Lees Commercial Carpet.

4. Milliken Carpet.

B. Basis of design: As selected by Architect from manufacturer's standard selection.

2.2 INSTALLATION ACCESSORIES:

A. Carpet edge strip: Burke Mercer Flooring Products, Imperial Reducer for glue-down installation; colors as selected by Architect from manufacturer's standard selection.

B. Adhesive: Water-resistant, mildew-resistant, non-staining type recommended by carpet tile manufacturer's product data for installation conditions. Adhesive shall be solvent-free, release type, allowing removal of carpet tile without damage to carpet tile or substrate.

C. Leveling compound; acceptable products:
1. Custom Building Products, LevelQuik RS.
2. Euclid Chemical Co., Floorstone with Latex Liquid.
3. Mapei, PLANI/PATCH.

D. Miscellaneous materials: Furnish fiberglass seaming tape, thread and similar accessories required for carpet installation.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Perform bond and moisture tests on subfloors in accord with ASTM F2170-02 and carpet tile flooring manufacturer's product data, to determine if surfaces are acceptable to receive specified carpet tile flooring products. Correct conditions detrimental to carpet tile flooring installation prior to starting installation.

B. Vacuum substrate immediately prior to beginning carpet installation. Remove debris, oil, grease and other foreign materials. Surfaces to receive installation shall be dry.

C. Grind high areas and fill depressions with leveling compound where required to produce smooth installation and for proper alignment of carpet with adjacent flooring materials.

3.2 WORKMANSHIP:

A. Except where more stringent requirements are specified herein, comply with manufacturer's product data and with CRI Commercial Installation Standard 104, Standard for Installation of Commercial Textile Floorcovering Materials.

B. Lay out carpeting materials in accord with approved shop drawings.

- C. Lay carpet tile with pattern and texture running in same direction. Do not seam weft to warp. Lay out for minimum number of seams. Locate seams perpendicular to doorways so as not to occur in doorways. Locate seams at doorways parallel to openings directly under door.
- D. Extend carpet tile under movable furniture and equipment and into closets of rooms indicated to be carpeted unless other floor finish is indicated in finish schedule.
- E. Install carpet edge strip at locations where edge of carpet is exposed to traffic except where another device, such as a threshold, is indicated.
- F. Maintain edges and seams straight and square with adjacent surfaces.

3.3 CARPET TILE INSTALLATION:

- A. Divide areas into grid pattern of maximum sizes recommended by manufacturer's product data. Center grid in each area, perpendicular to walls, but placed to avoid edge tiles of less than half tile size. Grids shall align continuously through door openings and visually adjacent areas.
- B. Adhesively apply first row of tiles to floor in both direction along grid centerlines. Loose lay remaining infill tiles except at door openings, where abutting other materials and where otherwise recommended by manufacturer's product data.
- C. Accurately scribe and cut tile to abutting surfaces. Maximum clearance shall be 1/32".
- D. Use carpet tiles from only one side of "cut" and one single dye lot within each complete area, and align tiles with grain in one direction as indicated on backs of tiles.
- E. Lay tiles with tightly abutted joints and corners, joint lines consistently straight and parallel.

3.4 CLEANING AND PROTECTION:

- A. At completion of installation, remove debris. Sort out scraps to be saved.
- B. Vacuum carpet with a commercial type vacuum cleaner having a rotating agitator in nozzle. Use corner attachment for vacuuming in corners and crevices.
- C. Remove stains with spot remover acceptable to carpet manufacturer.
- D. Immediately after cleaning, cover carpeted areas with heavy kraft paper. Maintain in place for remainder of construction period.
- E. Just prior to Date of Substantial Completion, remove protective covering and vacuum carpet. Steam clean areas if required to remove stains.

F. Replace carpet which cannot be cleaned.

3.5 EXCESS MATERIAL:

- A. Provide 6% excess of each type, pattern and color of carpet for Owner's use.
- B. Provide two cartons of each type, pattern and color of carpet tile for Owner's use.
- C. Salvage scraps from installation over three sq. ft. in area and over 1'-0" in width for Owner's use.
- D. Store excess material where directed by Owner.

End of Section

SECTION 09 9000

PAINTING AND COATING

PART 1 - GENERAL

1.1 SUMMARY:

- A. Work of this section includes:
 - 1. Touching up of shop-applied prime coats.
 - 2. Preparation of surfaces to receive finishes.
 - 3. Painting, staining or otherwise finishing of all surfaces, except as otherwise indicated.
 - 4. Priming, backpriming and finishing of finish carpentry.

- B. Related work specified elsewhere:
 - 1. Shop-applied primer coats.
 - 2. Joint sealants.
 - 3. Wall coverings.
 - 4. Special finishes.
 - 5. Piping identification.
 - 6. Prefinished items.
 - 7. Exterior insulation and finish system (EIFS).
 - 8. Elastomeric coating.

1.2 SUBMITTALS:

- A. Product data:
 - 1. Submit complete list of products proposed for use at least 30 days prior to commencement of painting work.
 - 2. Indicate manufacturer, brand name, quality, type, and sheen for each type of paint and for each surface to be finished. Indicate VOC rating and compliance with applicable regulations.
 - 3. Indicate manufacturer's instructions regarding mixing, surface preparation and application. Include application rates, film thickness and required primers.
 - 4. Intent of Contractor to use products specified does not relieve him from responsibility of submitting product list.

- B. Color samples: Submit two sets of color samples from paint manufacturers proposed for use, for color selections by Architect.

- C. Card stock brush-outs: Following issue of color schedule prepare two sets of color coat brush-outs for each paint and stain color and sheen scheduled, applying actual finish color coat to standard sample card stock, minimum 80 sq. in. size.

D. Substrate brush-outs:

1. In addition to color coat brush-outs, submit one actual brush-out sample application for each paint and stain type, color and sheen as applicable to the following substrates.
2. Apply complete finish system in the number of coats specified, to the actual substrate material or simulated material indicated; allow 1" offset of each successive coat along one edge to illustrate successive applications.
 - a. Concrete unit masonry: One face of a concrete block of the type and texture actually used on the project.
 - b. Drywall and concrete: Apply over gypsum wallboard, 1'-0" by 1'-0" size, edges taped and sanded.
 - c. Metals: Apply over hardboard, 1'-0" by 1'-0" size.
 - d. Painted wood: Wood stock typical of type, color and cut actually used on the project, minimum 6" wide by 1'-0" long.
 - e. Stained or transparent finished wood: Wood stock typical of type, species, grade, color and cut actually used on project, minimum 6" wide by 1'-0" long.

1.3 DELIVERY, STORAGE AND HANDLING:

- A. Delivery: Deliver materials to project site ready-mixed in original containers with labels intact; labels bearing manufacturer's name, paint type, color and recommended installation and reducing procedures.
- B. Storage and handling:
 1. Store materials in location acceptable to Architect.
 2. Maintain neat, clean conditions in storage area; remove rags and waste materials at end of each day's work.
 3. Close containers at end of day's work. Leave no materials open.

1.4 PROJECT/SITE CONDITIONS:

- A. Environmental requirements:
 1. Comply with manufacturer's product data as to environmental conditions under which materials may be applied.
 2. Apply no materials in spaces where dust is being generated.
 3. Comply with applicable VOC regulations.
- B. Protection: Cover finished work of other trades and surfaces not being painted concurrently and prefinished items.

- C. Safety precautions:
1. Provide temporary fire protection equipment in materials storage area.
 2. Prohibit smoking in storage area.

1.5 QUALITY ASSURANCE:

- A. Applicable standards, as referenced herein: Environmental Protection Agency (EPA), volatile organic compounds (VOC) standards as required by local codes and regulations.

PART 2 - PRODUCTS

2.1 PAINTING MATERIALS:

- A. Acceptable manufacturers: Except as otherwise noted, products specified as a standard of quality are manufactured by Pittsburgh Paints. Products of the following manufacturers similar in type and quality are acceptable for use, subject to approval of product list:
1. Scheduled: Pittsburgh Paints.
 2. Benjamin Moore Co.
 3. Duron Paint Co.
 4. ICI Dulux
 5. Porter Paint Co.
 6. Sherwin-Williams Co.
- B. Where products other than those of the manufacturer listed as the standard of quality are specified in Painting Schedule, such products have been selected to achieve specific results and substitutions will be allowed only in accord with Product Substitution Procedures section.
- C. Miscellaneous materials:
1. Paint thinners and tints shall be products of same manufacturer as paints or approved by him for use with his products.
 2. Shellac, turpentine, patching compounds and similar materials required for execution of work shall be pure, best quality products.
- D. Paint and stain colors will be selected by Architect from manufacturer's standard color range with final approval based on brush-out submittal.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Surfaces to receive finishes shall be dry and free of debris, oils, dust or other deleterious materials.

B. Existing surfaces:

1. For previously painted surfaces, remove dirt, debris and chalk by washing with detergent and water. Sand glossy surfaces. Remove loose paint and blisters by scraping and sanding. Apply bond coat when required by paint manufacturer's product data.
2. Previously painted metal surfaces to remain shall be wire-brushed and cleaned of all existing paint and rust.
3. Treat mildewed surfaces with a solution of one quart hypochlorite bleach to a half cup of detergent to one gallon water. Rinse and allow to dry prior to painting.
4. Previously painted masonry:
 - a. Where existing paint is loose or blistered, remove by scraping or brushing.
 - b. Remove debris and chalking from surfaces by washing with detergent and water. Flush with clean water. Touch up with material specified for finish.

C. Where finish materials abutt or are abutted by dissimilar materials, caulk joints in accord with Joint Sealants section.

D. Lumber, plywood and veneered wood surfaces:

1. Apply shellac, maximum two pounds cut to knots, pitch and resinous sapwood prior to application of first paint or stain coat.
2. For surfaces to receive opaque finish, fill nail holes, cracks, joints and defects with spackling compound. Apply after first coat of paint.
3. For surfaces to receive transparent finish, fill nail holes, cracks and defects with wood filler matching finish color.
4. Sand surfaces smooth except where rough sawn surfaces are indicated. Final step shall remove scuffs, handling marks and effects of moisture exposure. Dust to remove debris.
 - a. Sand plane surfaces using sanding block; touch sand moldings in manner preventing removal of sharp edges or obscuring profile.
 - b. Moldings cut with machine finish or minimum 16 knife cuts per inch shall not require further sanding except to correct irregularities.
 - c. Sand surfaces within normal visual range, including surfaces within 10'-0" of floor level, using not less than 80 grit abrasive exterior or 100 grit abrasive interior, except increase to 120 to 180 grit abrasive for transparent finished interior surfaces.
 - d. Install prefinished or presurfaced items following finishing or sanding of adjacent surfaces. Replace prefinished items damaged by finishing of adjacent work.

- E. Gypsum drywall:
 - 1. Fill narrow, shallow cracks and small holes with patching compound. Allow to dry and sand smooth without raising nap of wallboard paper.
 - 2. Drywall shall be finished as specified in Gypsum Board section prior to painting.

- F. Concrete:
 - 1. Fill cracks, holes and irregularities with cement grout.
 - 2. Remove laitance, oil, grease, dirt and debris from surfaces. Allow concrete to cure prior to paint application.

- G. Concrete unit masonry: Rub to remove loose mortar and debris. Fill irregularities with cement grout.

- H. Galvanized metals:
 - 1. Test for passivator or stabilizer using copper sulfate solution (20 grams of copper sulfate in one liter of water). If passivator or stabilizer is present, remove by brush blasting, sanding or chemical etching.
 - 2. Wash with xylol to remove grease, oil and contaminants. Wipe dry with clean cloth.

- I. Aluminum:
 - 1. Sand or scrape to remove oxides.
 - 2. Wash with xylol to remove grease, oil and contaminants. Wipe dry with clean cloth.

- J. Ferrous metals:
 - 1. Wire-brush or sandpaper to remove rust and mill scale.
 - 2. Solvent-clean with xylol to remove grease, oil and contaminants. Wipe dry with clean cloth.

3.2 APPLICATION:

- A. Apply paint only when moisture content of surfaces is within limits recommended in product data. Apply paint materials using clean brushes, rollers or spraying equipment.

- B. Apply materials at rate not exceeding that recommended in product data for surface being painted, less ten percent for losses.

- C. Comply with product data for drying time between coats.

- D. Sand and dust between coats to remove defects visible from a distance of 5'-0".

- E. Finish coats shall be smooth, free of brush marks, streaks, laps or pile-up of paint, skipped or missed areas. ** Do not apply additional coats until completed coat has been observed by Architect. Only these coats of paint will be considered in determining number of coats applied. **

- F. Make edges of paint adjoining other materials or colors clean and sharp without overlapping.
- G. Primer coats may be omitted for surfaces specified to receive factory-applied primer, if primer is compatible with finish coats. If primer coats are not compatible, substitute a bond coat as recommended by paint manufacturer for specified primer coat.
- H. Where two-coat finish is specified, prime coat shall be tinted to approximate finish color.
- I. Where portion of finish on drywall partition is damaged or unacceptable, refinish entire surface of partition.
- J. Seal tops and bottoms of interior doors with prime coat only; side edges same as faces.
- K. Finish all edges of exterior doors same as faces.
- L. Backprime finish carpentry with material specified for prime coat, without runs on face. Finish cut edges prior to installation.
- M. Paint inside of ductwork flat black for entire area visible through ceiling openings. Paint underside of ductwork and other above-ceiling items flat black for entire area visible through ceiling openings.
- N. Paint exposed piping and ductwork in painted spaces same as adjacent wall surfaces.
- O. Unless otherwise indicated, paint all construction on roof top, including prefinished mechanical and electrical equipment.
- P. Unless otherwise indicated, paint all ground mounted mechanical, plumbing and electrical equipment, including prefinished equipment.
- Q. Paint exposed grilles and registers in public spaces.
- R. Paint walls, exposed structure, handrails and exposed ductwork and piping in stairwells.
- S. Remove and protect hardware, accessories, device plates, lighting fixtures, factory-finished work and similar items, or provide in-place protection. Upon completion of each space, replace removed items.

3.3 PAINTING SCHEDULE:

- A. Surfaces not requiring painting:
 - 1. Face brick.
 - 2. Architectural precast concrete.
 - 3. Architectural concrete masonry units.

4. Prefinished and factory-finished surfaces and items, except where specifically indicated otherwise.
 5. Concealed ductwork, conduit and piping.
- B. Exterior surfaces; number of coats specified are minimum:
1. Concrete unit masonry: As specified in Elastomeric Coating section.
 2. Concrete: As specified in Cementitious Coatings section.
 3. Ferrous metals and aluminum, acrylic enamel:
 - a. First coat: 6-208/212 PPG Speedhide Alkyd Rust Inhibitive Steel Primers.
 - b. Second coat: 90-374 Series Gloss PPG Pitt Tech Interior/ Exterior DTM Waterborne Acrylic Enamel.
 - c. Third coat: 90-374 Series Gloss PPG Pitt Tech Interior/ Exterior DTM Waterborne Acrylic Enamel.
 4. Galvanized metals, acrylic enamel:
 - a. First coat: 90-708 Series PPG Pitt Tech Interior/ Exterior DTM Waterborne Acrylic Primer/Finish.
 - b. Second coat: 90-374 Series Gloss PPG Pitt Tech Interior/ Exterior DTM Waterborne Acrylic Enamel.
 - c. Third coat: 90-374 Series Gloss PPG Pitt Tech Interior/ Exterior DTM Waterborne Acrylic Enamel.
- C. Interior surfaces; number of coats specified are minimum:
1. Wood for painted finish, semi-gloss latex enamel:
 - a. First coat: 17-955 PPG Seal Grip Interior Latex Enamel Undercoater.
 - b. Second coat: 6-510 Series PPG Speedhide Latex Semi-Gloss Interior Wall & Trim Enamel.
 - c. Third coat: 6-510 Series PPG Speedhide Latex Semi-Gloss Interior Wall & Trim Enamel.
 2. Close grain wood for transparent finish, acrylic:
 - a. First coat: 77-560 PPG REZ Interior Semi Transparent Oil Wood Stain.
 - b. Second coat: 77-49 PPG REZ Interior Acrylic Polyurethane Satin Varnish.
 - c. Third Fourth coat: 77-49 PPG REZ Interior Acrylic Polyurethane Satin Varnish.
 3. Open-grain wood for transparent finish, acrylic:
 - a. First coat: 77-560 PPG REZ Interior Semi Transparent Oil Wood Stain.
 - b. Second coat: PPG Olympic Wood Filler.
 - c. Third coat: 77-49 PPG REZ Interior Acrylic Polyurethane Satin Varnish.
 - d. Fourth coat: 77-49 PPG REZ Interior Acrylic Polyurethane Satin Varnish.
 4. Concrete walls:
 - a. First coat: 4-603 Series PPG Perma-Crete Interior/Exterior alkali Resistant Primer.
 - b. Second coat: 6-510 Series PPG Speedhide Latex Semi-Gloss Interior Wall & Trim Enamel.
 - c. Third coat: 6-510 Series PPG Speedhide Latex Semi-Gloss Interior Wall & Trim Enamel.

5. Concrete unit masonry, semi-gloss latex:
 - a. First coat: 6-7 PPG Speedhide Masonry
 - b. Second coat: 6-510 Series PPG Speedhide Latex Semi-Gloss Interior Wall & Trim Enamel.
 - c. Third coat: 6-510 Series PPG Speedhide Latex Semi-Gloss Interior Wall & Trim Enamel.
6. Concrete unit masonry at toilets and at wet/high abuse areas, epoxy-polyamide:
 - a. First coat: 95-217 Pittsburgh Paints Cementitious Waterproofing Block Filler.
 - b. Second coat: 95-1 Series PPG Aquapon 35 Polyamide-Epoxy Gloss Coating.
 - c. Third coat: 95-1 Series PPG Aquapon 35 Polyamide-Epoxy Gloss Coating.
7. Gypsum wallboard, flat latex:
 - a. First coat: 6-2 PPG Speedhide Interior Latex Sealer Quick-Drying.
 - b. Second coat: 5-70 Series PPG Speedcraft Latex Flat Interior Wall & Ceiling Paint.
 - c. Third coat: 5-70 Series PPG Speedcraft Latex Flat Interior Wall & Ceiling Paint.
8. Gypsum wallboard, latex eggshell:
 - a. First coat: 6-2 PPG Speedhide Interior Latex Sealer Quick-Drying.
 - b. Second coat: 6-411 Series PPG Speedhide Latex Eggshell Interior Wall & Trim Enamel.
 - c. Third coat: 6-411 Series PPG Speedhide Latex Eggshell Interior Wall & Trim Enamel.
9. Gypsum wallboard, semi-gloss latex:
 - a. First coat: 6-2 PPG Speedhide Interior Latex Sealer Quick-Drying.
 - b. Second coat: 6-510 Series PPG Speedhide Latex Semi-Gloss Interior Wall & Trim Enamel.
 - c. Third coat: 6-510 Series PPG Speedhide Latex Semi-Gloss Interior Wall & Trim Enamel.
10. Gypsum wallboard at wet/high abuse areas, epoxy-polyamide:
 - a. First coat: 17-921 Seal Grip Interior/Exterior Acrylic Latex Stain Blocking Primer.
 - b. Second coat: 95-1 Series PPG Aquapon 35 Polyamide-Epoxy Gloss Coating.
 - c. Third coat: 95-1 Series PPG Aquapon 35 Polyamide-Epoxy Gloss Coating.
11. Ferrous and galvanized metals and aluminum, alkyd semi-gloss:
 - a. First coat: 6-208/212 PPG Speedhide Alkyd Rust Inhibitive Steel Primers. (FOR ALUMINUM & GALVANIZED: 90-708 Series PPG Pitt Tech Interior/Exterior DTM Waterborne Acrylic Primer/Finish.
 - b. Second coat: 6-1110 Series PPG Speedhide Interior Alkyd Semi-Gloss Enamel.
 - c. Third coat: 6-1110 Series PPG Speedhide Interior Alkyd Semi-Gloss Enamel.

- D. High temperature surfaces, exterior and interior; number of coats specified are minimum:
1. Preparation: Clean metal surfaces as follows:
 - a. First cleaning: SSPC-SP3, Power Tool Cleaning.
 - b. Second cleaning: SSPC-SP1, Solvent Cleaning.
 2. Metal for up to 1000 degrees F., aluminum finish:
Minimum first cleaning: SSPC SP 10 [NACE No. 2]
 - a. First coat: 6-220 PPG Speedhide
Interior/Exterior Heat Resistant Coating.
 - b. Second coat: 6-220 PPG Speedhide
Interior/Exterior Heat Resistant Coating.
 3. Metal for up to 800 degrees F., aluminum finish:
 - a. First coat: UC 59571 PPG PITT-THERM High Heat Coating; gray color.
 - b. Second coat: UC 59571 PPG PITT-THERM High Heat Coating; gray color.
- E. Dry fog coating for interior exposed structural system, including joists, beams and metal decking; alkyd enamel; number of coats specified are minimum:
1. First coat:
 - a. Ferrous metals: 97-680 Series MULTI-PRIME Quick Dry Universal Metal Primer. {or} G9514 Pittsburgh Paints Interior Dry-Fog Primer/Finish Flat.
 - b. Galvanized metals and aluminum: No primer required.
 2. Second coat: G9514 Pittsburgh Paints Interior Dry-Fog Primer/Finish Flat.
 3. Third coat:[If Required] G9514 Pittsburgh Paints Interior Dry-Fog Primer/Finish Flat.

End of Section