SECTION 05 5133 - METAL LADDERS

1.01 SECTION INCLUDES
A. Shop-fabricated metal ladders.
1.02 SUBMITTALS
A. Shop Drawings:
1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
1.03 QUALITY ASSURANCE
A. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.
B. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

2.01 MATERIALS - STEEL
A. Steel Sections: ASTM A36/A36M.
B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
C. Plates: ASTM A283/A283M.
D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
E. Mechanical Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.
F. Bolts, Nuts, and Washers: ASTM A307, plain.
G. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
H. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
2.02 FABRICATION
A. Fit and shop assemble items in largest practical sections, for delivery to site.
B. Fabricate items with joints fitted and secured.
C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
2.03 FABRICATED LADDERS
A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish.
1. Side Rails: 3/8 by 2-1/2 inches members spaced at 20 inches.
2. Rungs: One inch diameter solid round bar spaced 12 inches on center.
3. Space rungs 8 inches from wall surface.
2.04 FINISHES - STEEL
A. Prime paint steel items.
B. Prime Painting: One coat.
2.05 FABRICATION TOLERANCES
A. Squareness: 1/8 inch maximum difference in diagonal measurements.
B. Maximum Offset Between Faces: 1/16 inch.
C. Maximum Misalignment of Adjacent Members: 1/16 inch.
D. Maximum Bow: 1/8 inch in 48 inches.
E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

3.01 EXAMINATION
A. Verify that field conditions are acceptable and are ready to receive work.
3.02 PREPARATION
A. Clean and strip primed steel items to bare metal where site welding is required.
B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.
3.03 INSTALLATION
A. Install items plumb and level, accurately fitted, free from distortion or defects.
B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
C. Obtain approval prior to site cutting or making adjustments not scheduled.
3.04 TOLERANCES
A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
B. Maximum Offset From True Alignment: 1/4 inch.
C. Maximum Out-of-Position: 1/4 inch.

SECTION 06 1000 - ROUGH CARPENTRY

1.01 SECTION INCLUDES
A. Sheathing.
B. Roofing nailers.
C. Preservative treated wood materials.
D. Fire retardant treated wood materials.
E. Communications and electrical room mounting boards.
F. Concealed wood blocking, nailers, and supports.
1.02 SUBMITTALS
A. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.
1.03 DELIVERY, STORAGE, AND HANDLING
A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

2.01 GENERAL REQUIREMENTS
A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
2.02 DIMENSION LUMBER
A. Sizes: Nominal sizes as indicated on drawings, S4S.
B. Moisture Content: S-dry or MC19.
C. Miscellaneous Blocking, Nailers, and Furring:
1. Lumber: S4S, No. 2 or Standard Grade.
2. Boards: Standard or No. 3.
2.03 CONSTRUCTION PANELS
A. Roof Sheathing: Any PS 2 type, rated Structural I Sheathing.
1. Bond Classification: Exterior.
2. Span Rating: 60.
3. Performance Category: 3/4 PERF CAT.
B. Wall Sheathing: Any PS 2 type.
1. Bond Classification: Exterior.
2. Grade: Structural I Sheathing.
3. Span Rating: 24.
4. Performance Category: 5/8 PERF CAT.
C. Wall Sheathing: Glass mat faced gypsum, ASTM C1177/C1177M, 5/8 inch Type X fire resistant.
1. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly.
D. Wall Sheathing: Extruded Polystyrene (XPS) board insulation, ASTM C578.
1. Board Edges: Tongue-and-groove.
2. Type and Thermal Resistance, R-value (RSI-value): Type IV, 5.0 (0.88) per 1 inch at 75 degrees F mean temperature using ASTM C177 test method.
E. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
2.04 ACCESSORIES
A. Fasteners and Anchors:
1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for exterior, roof related and preservative-treated wood locations, unfinished steel elsewhere.
2.05 FACTORY WOOD TREATMENT
A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
B. Fire Retardant Treatment:
1. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
b. Do not use treated wood in direct contact with the ground.
2. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
b. Treat rough carpentry items as indicated .
c. Do not use treated wood in applications exposed to weather or where the wood may become wet.

3.01 INSTALLATION - GENERAL
A. Select material sizes to minimize waste.
B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.
3.02 BLOCKING, NAILERS, AND SUPPORTS
A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
E. Provide the following specific non-structural framing and blocking:
1. Handrails.
2. Grab bars.
3. Toilet room accessories.
3.03 ROOF-RELATED CARPENTRY
A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
3.04 INSTALLATION OF CONSTRUCTION PANELS
A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
1. At long edges use sheathing clips where joints occur between roof framing members.
2. Screw panels to framing; staples are not permitted.
B. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
C. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
3. Install adjacent boards without gaps.
3.05 SITE APPLIED WOOD TREATMENT
A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.
B. Allow preservative to dry prior to erecting members.
3.06 TOLERANCES
A. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.
3.07 CLEANING
A. Waste Disposal: Comply with the requirements of Section 01 7419 - Construction Waste Management and Disposal.
1. Comply with applicable regulations.
2. Do not burn scrap on project site.
3. Do not burn scraps that have been pressure treated.
4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
C. Composition, sawdust and wood shavings from entering the storm drainage system.

SECTION 07 2100 - THERMAL INSULATION

1.01 SECTION INCLUDES
A. Board insulation and integral vapor retarder cavity wall construction, perimeter foundation wall, underside of floor slabs, and as indicated on drawings.
B. Batt insulation and vapor retarder in exterior wall, ceiling, and roof construction.
C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.
1.02 SUBMITTALS
A. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
1.03 FIELD CONDITIONS
A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

2.01 APPLICATIONS
A. Insulation Under Concrete Slabs: Extruded polystyrene (XPS) board.
B. Insulation at Perimeter of Foundation: Extruded polystyrene board.
C. Insulation Inside Masonry Cavity Walls: Extruded polystyrene (XPS) board.
D. Insulation in Metal Framed Walls: Batt insulation with specified vapor retarder.
2.02 FOAM BOARD INSULATION MATERIALS
A. Extruded Polystyrene (XPS) Board Insulation: Comply with ASTM C578 with either natural skin or cut cell surfaces.
1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
3. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88), minimum, per 1 inch thickness at 75 degrees F mean temperature.
2.03 MINERAL FIBER BLANKET INSULATION MATERIALS
A. Flexible Glass Fiber Blanket Thermal Insulation: Preformed insulation, complying with ASTM C665; friction fit.
1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
4. Formaldehyde Content: Zero.
5. Facing: Unfaced.
a. In Climate Zones 4c and above; where a separate vapor retarder is being used.
b. In Climate Zones 1, 2, 3, 4a & 4b; where no vapor retarder is required.
6. Facing: Asphalt treated Kraft paper, one side.
a. In Climate Zones 4c and above; where a vapor retarder is required.
b. Facing can not be exposed.
2.04 ACCESSORIES
A. Sheet Vapor Retarder: Polyamide film with variable vapor permeability based on ambient humidity. Permeance of 1 perm or less by the dry cup method, increasing to 10 perms by the wet cup method. Flame spread rating of 25 or less, when tested in accordance with ASTM E84.
B. Tape joints of rigid insulation in accordance with roofing and insulation manufacturers' instructions.
C. Insulation Fasteners: Lengths of unfinished, 13 gauge, 0.072 inch high carbon spring steel with chisel or mitered tips, held in place by tension, length to suit insulation thickness and substrate, capable of securely supporting insulation in place.
D. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.
E. Adhesive: Type recommended by insulation manufacturer for application.

3.01 EXAMINATION
A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.
3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER
A. Install boards vertically on foundation perimeter.
1. Install in running bond pattern.
2. Butt edges and ends tightly to adjacent boards and to protrusions.
B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
3.03 BOARD INSTALLATION CONTINUOUS ON INTERIOR AT EXTERIOR WALLS
A. Install rigid insulation directly to concrete or masonry with manufacturer recommended adhesive. Tape all joints with manufacturer's minimum 4 inch wide sealant tape; comply with ASTM E2357.
1. Three continuous beads per board length.
B. Install rigid insulation directly to steel studs with manufacturer recommended mechanical fasteners. Tape all joints with manufacturer's minimum 4 inch wide sealant tape; comply with ASTM E2357.
C. Install boards vertically on walls.
1. Place boards to maximize adhesive contact.
2. Install in running bond pattern.
3. Butt edges and ends tightly to adjacent boards and to protrusions.
D. Extend boards over expansion joints, unbonded to wall on one side of joint.
3.04 BOARD INSTALLATION AT CAVITY WALLS
A. Install boards to fit snugly between wall ties.
B. Install boards horizontally on walls.
1. Install in running bond pattern.
2. Butt edges and ends tightly to adjacent boards and protrusions.
C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
3.05 BOARD INSTALLATION UNDER CONCRETE SLABS
A. Place perimeter insulation under slabs on grade after base for slab has been compacted.
B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.
3.06 BATT INSTALLATION
A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
B. Install in exterior wall, roof, and ceiling spaces without gaps or voids. Do not compress insulation.
C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
E. Install with factory applied vapor retarder membrane facing warm side of wall assembly. Lap ends and side flanges of membrane over framing members.
F. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
G. Place Sheet Vapor Retarder on warm side of insulation; lap and seal sheet retarder joints over member face.
H. Tape seal tears or cuts in vapor retarder.
I. Extend vapor retarder membrane tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.
3.07 PROTECTION
J. Do not permit installed insulation to be damaged prior to its concealment.

SECTION 07 2500 - WEATHER BARRIERS

1.01 SECTION INCLUDES
A. Water-resistive barriers.
1.02 DEFINITIONS
A. Water-Resistive Barriers: Materials or assemblies installed behind exterior wall coverings; designed to prevent liquid water from further penetration into exterior wall assembly.
1.03 SUBMITTALS
A. Product Data: Provide data on material characteristics, performance criteria, and limitations.
1.04 FIELD CONDITIONS
A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

2.01 WEATHER BARRIER ASSEMBLIES
A. Weather Barrier: Provide on exterior walls under exterior cladding and where indicated in other sections , and as indicated on drawings.
1. Under cladding at framed walls with sheathing, use weather barrier sheet .
2. Under cladding at masonry, use weather barrier coating .
3. On outside surface of inside wythe of exterior masonry cavity walls, use weather barrier coating.
2.02 WATER-RESISTIVE BARRIERS
A. Water-Resistive and Air Barrier, Multilayers: Outer layers of nonwoven, spunbonded polypropylene with vapor permeable, watertight polymeric middle layer.
1. Air Permeance: 0.0011 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
2. Water Vapor Permeance: 10 perms , minimum, when tested in accordance with ASTM E96/E96M using Procedure A - Desiccant Method, at 73.4 degrees F .
3. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 3 months of weather exposure.
4. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, Class A when tested in accordance with ASTM E84.
5. Seam and Perimeter Tape: As recommended by sheet manufacturer.
B. Water-Resistive Barrier Coating: Fluid-applied air and water-resistive coating for various exterior substrates.
1. Air Permeance, Building Material Air Leakage Rate: 0.004 cfm/sq ft maximum leakage when tested at 1.57 psf pressure difference in accordance with ASTM E2178.
2. Water-Resistive Barrier over Sheathing Compliance: Complying with ICC-ES AC212.
3. Water Vapor Permeance: Tested in accordance with ASTM E96/E96M.
a. Procedure A: Greater than 5 perms.
b. Procedure B: Greater than 14 perms.
4. Dry Film Thickness (DFT): 10 mils, 0.010 inch , minimum.
5. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 120 days of weather exposure.
6. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 120 days of weather exposure.
7. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, Class A when tested in accordance with ASTM E84.
8. Resistance to Fungal Growth: No growth when tested in accordance with ASTM D5590.
9. System Accessory Products: As recommended by coating manufacturer.
2.03 ACCESSORIES
A. Seal and Perimeter Tapes: As recommended by water-resistive barrier manufacturer.
B. Flashings and Sealants: As recommended by water-resistive barrier manufacturer for application.
C. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrates and weather barrier materials.
1. Application: Apply at 30 to 40 mil, 0.030 to 0.040 inch nominal thickness.
2. Elongation: 1,300 percent, measured in accordance with ASTM D412.
3. Peel Adhesion: 28 lb/inch, minimum, when tested in accordance with ASTM D903.
4. Hydrostatic Head Pressure: Resist head pressure of 57 feet, maximum, when tested in accordance with ASTM D751.
D. Primer: Liquid applied polymer.
1. Elongation: 1,300 percent, measured in accordance with ASTM D412.
E. Flexible Flashing: Self-adhering sheet flashing complying with ASTM D1970/D1970M; waive slip resistance requirement if not installed on roof.
1. Width: 4 inches.
2. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 30 days of weather exposure.
F. Sill Plate Sealer: Closed-cell foam tape with rubberized adhesive membrane; bridges gap between foundation structure and sill plate or skirt board.
1. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 30 days of weather exposure.
G. Fasteners: Type as recommended by the manufacturer for substrate and construction.
H. Tape: Product manufactured by the membrane manufacturer.

3.01 EXAMINATION
A. Verify that surfaces and conditions comply with requirements of this section.
3.02 PREPARATION
A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's instructions.
3.03 INSTALLATION
A. Install materials in accordance with manufacturer's installation instructions.
B. Install continuous water-resistive barriers where indicated on drawings, with sheets lapped to shed water.
C. Apply sealants within recommended temperature range in accordance with manufacturer's installation instructions.
D. Mechanically Fastened Membranes :
1. Install membranes in shingle fashion to shed water; align horizontally.
2. Overlap seams as recommended by manufacturer, 6 inches, minimum.
3. Overlap at outside and inside corners as recommended by manufacturer, 12 inches, minimum.
4. Attach to framed construction with fasteners extending through sheathing into framing. Space fasteners at 12 to 18 inches on center along each framing member supporting sheathing, unless otherwise indicated in manufacturer's installation instructions.
5. Where stud framing rests on concrete or masonry, extend lower edge of sheet at least 4 inches below bottom of framing and seal to wall with sealant.
6. Install wall flashings under weather barrier.
7. Coordinate transitions between dissimilar weather barrier materials to shed water and maintain continuity of weather barrier system.
E. Self-Adhered Membranes:
1. Prepare substrate in accordance with sheet manufacturer's installation instructions; fill and tape joints in substrate and between dissimilar materials.
2. Lap sheets shingle-fashion to shed water and seal laps airtight.
3. Upon placement of sheets, firmly press onto substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.
4. Use same material, or other material approved by sheet manufacturer, to seal sheets to adjacent substrates, and as flashing.
5. At expansion joints, provide transition to joint assemblies approved by sheet manufacturer.
F. Fluid-Applied Membranes :
1. Prepare substrate in accordance with coating manufacturer's installation instructions; treat joints in substrate and between dissimilar materials as indicated.
2. Where exterior masonry veneer is being applied, install masonry anchors prior to placement of water-resistive barrier over masonry substrate; seal airtight around anchors.
3. Apply flashing to seal with adjacent construction and to bridge joints in coating substrate.
4. Coordinate transitions between dissimilar weather barrier materials to shed water and maintain continuity of weather barrier system.
G. Openings and Penetrations in Exterior Water-Resistive Barriers:
1. Install flashing over sills, covering entire sill framing member, and extend at least 5 inches onto water-resistive barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
2. At openings filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
3. At openings filled with nonflanged frames, seal water-resistive barrier to each side of framing at opening using flashing at least 9 inches wide, and covering entire depth of framing.
4. At head of openings, install flashing under water-resistive barrier extending at least 2 inches beyond face of jambs; seal water-resistive barrier to flashing.
5. At interior face of openings, seal gaps between window and door frames and rough framing using appropriate joint sealant over backer rod.
6. Service and Other Penetrations: Form flashing around penetrating items and seal to surface of water-resistive barrier.
3.04 FIELD QUALITY CONTROL
A. Owner's Inspection and Testing: Cooperate with Owner's testing agency.
1. Allow access to work areas and staging.
2. Notify Owner's testing agency in writing of schedule for work of this section to allow sufficient time for testing and inspection.
3. Do not cover work of this section until testing and inspection is accepted.
B. Obtain approval of installation procedures from water-resistive barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.
C. Take digital photographs of each portion of installation prior to covering up weather barriers.
3.05 PROTECTION
A. Do not leave materials exposed to weather longer than recommended by manufacturer.

Columbia County Building Department
Plans Reviewed for Code Compliance
State of Florida

SECTION 07 4113 - METAL ROOF PANELS

1.01 SECTION INCLUDES
A. Metal roof panel system of preformed steel panels.
1.02 DESIGN REQUIREMENTS
A. Design, fabricate, handle, and install panels to minimize oil canning. Excessive oil canning as determined by the Architect may be grounds for rejection.
1.02 SUBMITTALS
A. Shop Drawings: Indicate dimensions, layout, joints, construction details, and methods of anchorage.
B. Samples: Submit two samples of wall panel and soffit panel, 12 inch by 12 inch in size illustrating finish color, sheen, and texture.
1.03 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of experience.
B. Installer Qualifications: Company specializing in installing products of the type specified in this section with minimum three years of experience.
1.04 DELIVERY, STORAGE, AND HANDLING
A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
B. Store prefinished material off the ground and protected from weather; prevent twisting, bending, or abrasion; provide ventilation; slope metal sheets to ensure proper drainage.
C. Prevent contact with materials that may cause discoloration or staining of products.
1.05 WARRANTY
A. Provide manufacturer's standard material finish warranty, agreeing to repair or replace panels that show evidence of finish degradation, including fading, chalking, cracking, or peeling.
1. Warranty period 20 years, non-prorated.

2.01 METAL WALL PANEL SYSTEM
A. Wall Panel System: Factory fabricated prefinished metal panel system, site assembled.
1. Provide exterior wall panels, interior liner panels, soffit panels, and subgirt framing assembly.
2. Design and size components to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of wall.
3. Maximum Allowable Deflection of Panel: L/180 for length(L) of span.
4. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement between system and perimeter components subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
5. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
6. Fabrication: Formed true to shape, accurate in size, square, and free from distortion or defects; pieces of longest practical lengths.
7. Corners: Factory-fabricated in one continuous piece with minimum 2 inch returns.
8. Provide continuity of weather barrier seal at building enclosure elements in conjunction with materials specified in Section 07 2500.
B. Exterior Wall Panels:
1. Profile: Vertical and horizontal, as indicated.
2. Material: Precoated steel sheet, 22 gauge, 0.0299 inch minimum thickness.
3. Color: As indicated on drawings.
C. Interior Liner Panels:
1. Profile: Vertical and horizontal, as indicated; style as indicated.
2. Side Seams: Interlocking, sealed with continuous bead of sealant.
3. Color: As indicated on drawings.
D. Soffit Panels:
1. Profile: Style as indicated, with venting provided.
2. Material: Precoated aluminum sheet, 20 gauge, 0.032 inch minimum thickness.
3. Color: As indicated on drawings.
E. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; shop cut and factory mitered to required angles.
F. Expansion Joints: Same material, thickness and finish as exterior sheets; manufacturer's standard brake formed type, of profile to suit system.
G. Trim, Closure Pieces, Caps, Flashings, and Facias: Same material, thickness and finish as exterior sheets; brake formed to required profiles.
H. Anchors: Stainless steel.
2.02 MATERIALS
A. Precoated Steel Sheet: Aluminum-zinc alloy-coated steel sheet, ASTM A792/A792M, Commercial Steel (CS)) or Forming Steel (FS), with AZ50/AZM150 coating; continuous-coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.
B. Precoated Aluminum Sheet: ASTM B209 (ASTM B209M), 3105 alloy, O temper, smooth surface texture; continuous-coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.
2.03 FINISHES
A. Exposed Surface Finish: Panel manufacturer's standard polyvinylidene fluoride (PVDF) coating, top coat over epoxy primer.
B. Panel Backside Finish: Panel manufacturer's standard siliconized polyester wash coat.
2.04 ACCESSORIES
A. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant.
B. Concealed Sealants: Non-curing butyl sealant or tape sealant.
C. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.
D. Fasteners: Manufacturer's standard type to suit application; with soft neoprene washers, steel, hot dip galvanized. Fastener cap same color as exterior panel.
E. Field Touch-up Paint: As recommended by panel manufacturer.
F. Bituminous Paint: Asphalt base.

3.01 EXAMINATION
A. Verify that building framing members are ready to receive panels.
B. Verify that water-resistive barrier has been installed over substrate completely and correctly.
3.02 INSTALLATION
A. Install panels on walls and soffits in accordance with manufacturer's instructions.
B. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint. Allow to dry prior to installation.
C. Fasten panels to structural supports; aligned, level, and plumb.
D. Locate joints over supports.
E. Provide expansion joints where indicated.
F. Use concealed fasteners unless otherwise approved by Architect.
G. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.
3.03 TOLERANCES
A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.
B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch.
3.04 CLEANING
A. Remove site cuttings from finish surfaces.
B. Remove protective material from wall panel surfaces.
C. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

SECTION 07 5400 - THERMOPLASTIC MEMBRANE ROOFING (TPO)

1.01 ADMINISTRATIVE REQUIREMENTS
A. Preinstallation Meeting: Convene one week before starting work of this section.
1. Review preparation and installation procedures and coordinating and scheduling required with related work.
1.02 SUBMITTALS
A. Product Data: Provide data indicating membrane materials, flashing materials, insulation, surfacing, and fasteners.
B. Shop Drawings: Submit drawings that indicate joint or termination detail conditions, conditions of interface with other materials, and setting plan for tapered insulation.
1.03 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of experience.
B. Installer Qualifications: Company specializing in performing the work of this section with at least three years of experience and approved by manufacturer.
1.04 DELIVERY, STORAGE, AND HANDLING
A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.
B. Store materials in weather protected environment, clear of ground and moisture.
C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
D. Protect foam insulation from direct exposure to sunlight.
1.05 FIELD CONDITIONS
A. Do not apply roofing membrane during unsuitable weather.
B. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
D. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.
1.06 WARRANTY
A. System Warranty: Manufacturer's standard form, no dollar limit (NDL), in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
1. Warranty Term: 15 years.
2. For repair and replacement include costs of both material and labor in warranty.
3. Warranty includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, cover boards, walkway products, and other components of the roofing system.

2.01 ROOFING
A. Thermoplastic Membrane Roofing: One ply membrane, mechanically fastened, spot adhered or fully adhered as indicated on the drawings, over insulation.
B. Roofing Assembly Requirements:
1. Roof Covering External Fire Resistance Classification: UL (FRD) Class A.
C. Acceptable Insulation Types - Constant Thickness Application: Any type that meets requirements and is approved by membrane manufacturer for application.
1. Two layers of approximately equal thickness of polyisocyanurate board plus a cover board.
D. Acceptable Insulation Types - Tapered Application: Any type that meets requirements and is approved by membrane manufacturer for application.
2.02 MEMBRANE ROOFING AND ASSOCIATED MATERIALS
A. Membrane Roofing Materials:
1. TPO: Thermoplastic polyolefin (TPO) complying with ASTM D6878/D6878M, sheet contains reinforcing fabrics or scrims.
a. Thickness: 60 mil, 0.060 inch, minimum.
2. Sheet Width: Factory fabricated into largest sheets possible.
3. Color: White.
B. Seaming Materials: As recommended by membrane manufacturer.
C. Membrane Fasteners: As recommended and approved by membrane manufacturer.
D. Flexible Flashing Material: Same material as membrane.
2.03 COVER BOARDS
A. Cover Boards: Faced high compressive strength polyisocyanurate (ISO) insulation complying with ASTM C1289, and the following characteristics:
1. Classification:
a. Type II - Faced with either cellulosic facers or glass fiber mat facers on both major surfaces of the core foam.
1) Class 4 - faced with coated or uncoated glass-fiber-mat facers on both major surfaces of core foam.
(a) Compressive Strength: Grade 1, 80 psi.
(b) Thickness: 1/2 inch, maximum.
2. Board Size: 48 by 48 inches.
3. Insulation Thermal Resistance, R-value: R-value (RSI-value) of 2.9, nominal.
2.04 INSULATION
A. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
1. Classifications:
a. Type II:
1) Class 2 - Faced with coated polymer-bonded glass fiber mat facers on both major surfaces of core foam.
2) Compressive Strength: Classes 1-2-3, Grade 2 - 20 psi (138 kPa), minimum.
2. Board Size: 48 by 96 inch.
3. Maximum Board Thickness: 2.0 inch.
4. Thermal Resistance: R-value [as indicated on the drawings].
5. Tapered Board: Slope as indicated; minimum thickness 1/2 inch; fabricate of fewest layers possible.
2.05 ACCESSORIES
A. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches wide; self-adhering.
B. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
C. Membrane Adhesive: As recommended by membrane manufacturer.
D. Cover tape: Tape adhesive laminated to cover strip, as recommended by manufacturer, used to strip in metal flashings.
E. Surface Conditioner for Adhesives: Compatible with membrane and adhesives.
F. Thinners and Cleaners: As recommended by adhesive manufacturer, compatible with membrane.
G. Strip Regiet Devices: Stainless steel, maximum possible lengths per location, with attachment flanges.
H. Walkway Pads: Suitable for maintenance traffic, contrasting color or otherwise visually distinctive from roof membrane.
1. Composition: Roofing membrane manufacturer's standard.
I. Coated Metal: Laminate of TPO membrane and galvanized steel.
J. Flexible foam rod: Closed cell polyethylene, 1 1/2 inch diameter unless noted.

3.01 EXAMINATION
A. Verify that surfaces and site conditions are ready to receive work.
B. Verify deck is supported and secure.
C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
D. Verify deck surfaces are dry and free of snow or ice.
E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and nailing strips and regiets are in place.
3.02 INSTALLATION - GENERAL
A. Perform work in accordance with manufacturer's instructions, NRCA (RM), and NRCA (WM) applicable requirements.
B. Do not apply roofing membrane during unsuitable weather.
C. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.
D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
F. Coordinate this work with installation of associated counterflashings installed by other sections as the work of this section proceeds.
G. Fasten roofing assembly to resist the design uplift pressures as indicated on structural drawings.
H. In the absence of structural drawings, fasten roofing assembly to resist the design uplift pressures calculated in accordance with:
1. IBC Chapter 15.
2. IBC Chapter 16.
3. ASCE 7.
3.03 INSULATION
A. Attachment of Insulation: Mechanically fasten insulation to deck in accordance with roofing manufacturer's instructions and Factory Mutual requirements.
B. Cover Boards: Mechanically fasten cover boards in accordance with roofing manufacturer's instructions and FM (AG) Factory Mutual requirements.
C. Lay subsequent layers of insulation with joints staggered minimum 6 inch from joints of preceding layer.
D. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
E. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.
F. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
G. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 18 inches.
H. Do not apply more insulation than can be covered with membrane in same day.
3.04