# PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 and 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

A. Section Includes:
1. Polyisocyanurate foam-plastic continuous insulation.
2. Attic floor insulation and cover board.
3. Glass-fiber blanket.
4. Acoustical (Sound-Attenuation Blankets) insulation.

B. Related Requirements:
1. Section 018113 “Sustainable Design Requirements.”
2. Section 061600 "Sheathing" for sheathing installed directly over steel framing.
3. Section 078443 “Joint Firestopping” for joints at exterior curtain wall/floor intersections.
4. Section 075419 "Polyvinyl-Chloride (PVC) Roofing” for insulation specified as part of roofing construction.

## 1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. LEED Submittals: Credits MRc4 & MRc5. Refer to Section 018113 “Sustainable Design Requirements” for additional submittal requirements.

## 1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

B. Evaluation Reports: For foam-plastic insulation, from ICC-ES.

## 1.5 QUALITY ASSURANCE

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

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 POLYISOCYANURATE FOAM-PLASTIC BOARD (CONTINUOUS INSULATION)

A. Foil-Faced, Polyisocyanurate-Foam Board: ASTM C 1289, Type I, Class 2, rigid, cellular, polyisocyanurate thermal insulation. Foam-plastic core and facings shall have a flame-spread index of 25 or less when tested individually.
   1. Manufacturers: Subject to compliance with requirements, provide products by the following:
      a. The Dow Chemical Company, Dow Building Solutions; Thermax Sheathing (Basis-of-Design)
      b. Or Equal.
   2. Thickness: As indicated on Drawings.
   3. Nominal Density: 1.5 pounds minimum.
   4. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285 as part of project specific exterior cladding assemblies.

2.2 ATTIC FLOOR INSULATION AND COVER BOARD

A. Extruded Polystyrene Board, Type IV: ASTM C 578, Type IV, 25-psi psi minimum compressive strength; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.
   1. Provide insulation with a LTTR value of R30.

B. Cover Board: ASTM C 1177/C 1177M, glass-mat, gypsum board as recommended by insulation manufacturer.
   1. Product: Subject to compliance with requirements, provide the following:
      a. DensDeck Fireguard Roof Board by G-P Gypsum Corporation.
      b. GlasRoc Roof Board by CertainTeed.
      c. Or Equal.
   2. Flame Spread and Smoke Development: 0 when tested in accordance with ASTM E84.
   3. Type and Thickness:
      a. Type X fire-rated, 5/8 inch thick.

2.3 UNFACED GLASS FIBER BLANKET INSULATION

A. Products: Subject to compliance with requirements, provide one of the following:
   1. Knauf Insulation EcoBatt Insulation
   2. Bonded Logic, Inc., Ultratouch Denim Insulation
   3. Or Equal.

B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
   1. Provide R19 at exterior wall installations.
   2. Provide R30 at roof installations.

C. Unfaced, Natural Fiber Blanket Insulation: Recycled fiber products, boric, ammonium sulfate, binder fiber fabricated without fiberglass, asbestos or formaldehyde; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84.
   1. Provide R19 at exterior wall installations.
   2. Provide R30 at roof installations.

D. Sustainability Requirements: Provide glass-fiber blanket insulation as follows:
   1. Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.
   2. Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.

## 2.4 FACED GLASS FIBER BLANKET INSULATION

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Knauf Insulation.
   2. Johns Manville, a Berkshire Hathaway Company.
   3. CertainTeed Corporation.

B. Reinforced-Foil Faced Glass-Fiber Blanket,: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.

C. Sustainability Requirements: Provide glass-fiber blanket insulation as follows:
   1. Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.
   2. Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.

## 2.5 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.
   1. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
   2. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation indicated.

B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle; capable of holding insulation of specified thickness securely in position with self-locking washer in place.
   1. Angle: Formed from 0.030-inch-thick, perforated, galvanized carbon-steel sheet with each leg 2 inches square.

2. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation.

C. Exterior Washer at Polyisocyanurate-Foam Board: 2-inch diameter washer with solid cap design, with pre-spotting prongs and stiffened center to prevent fastener pull-through. Washer shall flatten on surface of insulation and shall prevent fastener from puncturing foam board.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Thermal Grip ci Prong Washer by Rodenhouse Fastening Systems.

D. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.
1. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
a. Crawl spaces.
b. Ceiling plenums.
c. Where indicated.

E. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.

## 2.6 ACCESSORIES

A. Insulation for Miscellaneous Voids:
1. Glass-Fiber Insulation: ASTM C 764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E 84.
2. Spray Polyurethane Foam Insulation: ASTM C 1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

# PART 3 - EXECUTION

## 3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

## 3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

E. Install exterior continuous polyisocyanurate-foam board insulation with washers as recommended by manufacturer.

## 3.3 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
   1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
   2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
   3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
   4. Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
   5. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
   6. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.
      a. Exterior Walls: Set units with facing placed as indicated on Drawings.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
   1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft..
   2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

## 3.4 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION