

SECTION 07210
BUILDING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Insulation under slabs-on-grade.
 - 2. Foundation wall insulation (supporting backfill).
 - 3. Concealed building insulation.
 - 4. Foamed-in-Place Insulation.
 - 5. Vapor retarders

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: Full-size units for each type of exposed insulation indicated.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulation products.
- D. Research/Evaluation Reports: For foam-plastic insulation.
- E. MSHA Submittals:
 - 1. Energy Efficiency - Building Envelope:
 - a. R 1: The building envelope must be sealed to prevent air leaks.
 - b. R 2: The thermal envelope shall be insulated in a manner that complies with either the requirements of Chapter 4 of the 2004 IECC or the requirements of state law whichever is more stringent.
 - c. R 4: Spaces between trusses or rafters shall have blocking at the soffit to prevent 'windwashing" of the attic insulation.
 - 2. Indoor Environmental Quality: R 3: Use low VOC adhesives & sealants.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of building insulation through one source.
- B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface-Burning Characteristics: ASTM E 84.
 - 2. Fire-Resistance Ratings: ASTM E 119.

3. Combustion Characteristics: ASTM E 136.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by 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.
- B. Protect plastic insulation as follows:
 1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
 2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
 3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATING MATERIALS

- A. General: Provide insulating materials that comply with requirements and with referenced standards.
 1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.
- B. Rigid Insulation, Type 1: Extruded-Polystyrene Board Insulation, ASTM C 578, of type and density indicated below, with maximum flame-spread and smoke-developed indices of 75 and 450, respectively:
 1. Type IV, 1.60 lb/cu. ft. (26 kg/cu. m).
 2. R value: 4.8/IN
 3. Available Products:
 - a. Foamular 250; Owens Corning.
 - b. Styrofoam by Dow Chemical Co.
 - c. Amofoam-CM by Tenneco Building Products
 4. Application: Foundation insulation. Rigid insulation below concrete slab-on-grade.
- C. Rigid Insulation, Type 2: Foil-Faced, Polyisocyanurate Board Insulation: ASTM C 1289, Type I, Class 1 or 2, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, based on tests performed on unfaced core on thicknesses up to 4 inches (101 mm).
 1. Thickness: As indicated on the drawings.
 2. R value: 6/IN.
 3. Available Products:
 - a. Atlas Roofing Corporation.
 - b. Dow Chemical Company.
 - c. Rmax, Inc.
 4. Application: Cavity-wall insulation and exterior wall insulation at siding.

- D. Polyiso Nailboard Panel: Polyisocyanurate Board Insulation; rigid, cellular thermal insulation with polyisocyanurate closed-cell foam core and glass-fiber-reinforced facing laminated to both sides. Insulation is laminated to 7/16 inch thick OSB nailboard.
1. R value: 25.96 / 4.5IN
 2. Available Products:
 - a. ACFoam NailBase by Atlas Roofing Corp.
 - b. Cornell Corporation: ThermaCal.
 - c. GenFlex NB: GenFlex Roofing Systems
 - d. Hunter Panels: H-Shield-NB.
- E. Batt Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from glass; with maximum flame-spread and smoke-developed indices of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
1. R value: 3.2/IN
 2. Available Products:
 - a. CertainTeed Corporation.
 - b. Guardian Building Products.
 - c. Johns Manville Corporation.
 - d. Owens Corning.
- F. Dense Pack Cellulose Insulation: Spray-in-place cellulose insulation with an installed density of 3.0 to 3.5 pounds per cubic foot. ASTM C 739, chemically treated for flame and mold-resistance, processing, and handling characteristics.
1. R value: 3.6/IN
 2. Available Products:
 - a. WallSeal by Nu-Wool, Inc.
- G. Sprayed Polyurethane Foam Sealant for Perimeter of Doors and Windows: 1- or 2-component, foamed-in-place, polyurethane foam sealant, 1.5 to 2.0 lb/cu. ft. (24 to 32 kg/cu. m) density; flame spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
1. R Value: 5.9/IN
 2. Products:
 - a. Great Stuff Window & Door by Dow
 - b. Froth-Pak by Insta-Foam Products, Inc.
 - c. Pur-Fill 1G by Todol Products, Inc.
 - d. Handi-Seal Window and Door Sealant by Fomo Products, Inc.
- H. Spray Foam Urethane Insulation: Two-component, spray-in-place, high-density, plastic foam with closed-cell structure, conforming to the following:
1. Flame/Smoke Properties: 25/450 in accordance with ASTM E84.
 2. R value: 6.5/IN
 3. Products:
 - a. Corbond.
 - b. Comfort Foam by Foam Enterprises.
- I. Unfaced, Slag-Wool-/Rock-Wool-Fiber Board Insulation: ASTM C 612, maximum flame-spread and smoke-developed indices of 15 and 0, respectively; passing ASTM E 136 for combustion characteristics; and of the following density, type, thermal resistivity, and fiber color:

1. Nominal density of 4 lb/cu. ft. (64 kg/cu. m), Types IA and IB, thermal resistivity of 4 deg F x h x sq. ft./Btu x in. at 75 deg F (27.7 K x m/W at 24 deg C).
2. Color: Natural.
3. R Value: 2.8/IN
4. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Fibrex Insulations Inc.
 - b. Owens Corning.
 - c. Thermafiber.

2.2 VAPOR RETARDERS

- A. Polyethylene Vapor Retarder: ASTM D 4397, 6 mils (0.15 mm) thick, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).
- B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
 1. Available Products: 3M Builder's Sealing Tape No. 8086.

2.3 AUXILIARY INSULATING MATERIALS

- A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.
 1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. VCT Adhesives: 50 g/L.
 - b. Cove Base Adhesives: 50 g/L.
- B. Fasteners for Nailboard Panels: Standard roofing fastener for wood deck with No. 3 Phillips truss head of sufficient length to penetrate sheathing a minimum of 3/4 inch. Provide fasteners by Olympic or approved substitute.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for Sections in which substrates and related work are specified and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances harmful to insulations or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice and snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Water-Piping Coordination: If water piping is located on inside of insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
- E. Apply single layer of insulation to produce thickness indicated, unless multiple layers are otherwise shown or required to make up total thickness.

3.4 INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION

- A. On vertical surfaces, set units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.
 - 1. If not indicated, extend insulation a minimum of 48 inches (1220 mm) below exterior grade line.
- B. Protect below-grade insulation on vertical surfaces from damage during backfilling. Set in adhesive according to insulation manufacturer's written instructions.
- C. Protect top surface of horizontal insulation from damage during concrete work.

3.5 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal joints between closed-cell (nonbreathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements:
 - 1. Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
 - 2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping stapling flanges to flanges of metal studs.
- D. Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:
1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
 2. Apply insulation standoffs to each spindle to create cavity width indicated between concrete substrate and insulation.
 3. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
 4. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.
- E. Place cellulose insulation into spaces and onto surfaces as shown by machine blowing to comply with manufacturer's recommendations. Allow drying time before installation of any vapor barrier and GWB per manufacturer's recommendations. Follow manufacturer's moisture testing recommendations to test the product in place before any installation of vapor barrier or drywall.
- F. Apply foamed-in-place insulation, by spray or froth method to a uniform monolithic density without voids into miscellaneous voids and cavity spaces where shown.
- G. Nailboard Sheathing to Wood Decking: Provide fasteners 16 inches on center, 8 inches in from the perimeter of each sheet. Provide fasteners 16 inches on center in the field of the sheet.

3.6 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.

3.7 WASTE MANAGEMENT

- A. Plan and coordinate the insulation work to minimum the generation of offcuts and waste. Reuse insulation scraps to the maximum extent feasible.
- B. Separate and recycle waste materials in accordance with the Waste Management Plan and to the maximum extent economically feasible.

END OF SECTION