

SECTION 07 21 00
THERMAL INSULATION

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
 - a. C272/C272M, Standard Test Method for Water Absorption of Core Materials for Sandwich Constructions.
 - b. C303, Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation.
 - c. C549, Standard Specification for Perlite Loose Fill Insulation.
 - d. C578, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
 - e. C612, Standard Specification for Mineral-Fiber Block and Board Insulation.
 - f. C665, Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - g. D4397, Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
 - h. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
 - i. E96/E96M, Standard Test Methods for Water Vapor Transmission of Materials.

1.02 SUBMITTALS

A. Action Submittals:

1. Shop Drawings: Manufacturer's product literature identifying products proposed for use.

B. Information Submittals:

1. Sustainable Design: In accordance with Section 01 81 13, Sustainable Design Requirements for Non-LEED™ Projects, document sustainability performance for items listed below.
 - a. Product Data for Recycled Materials:
 - 1) A complete list of materials and quantities.
 - 2) Percentage of post-consumer and pre-consumer recycled content of all materials.

- b. Product Data for Low Emitting Materials-Adhesives, and Sealants:
 - 1) A complete list of adhesives and sealants used inside the building envelope during construction.
 - 2) Manufacturer's literature documenting VOC content of each product, and compliance with requirements of South Coast Air Quality Management District (SCAQMD) Rule No. 1168.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. On packaging clearly identify manufacturer, contents, brand name, applicable standard, and R-value.
- B. Store materials off ground and keep them dry. Protect against weather, condensation, and damage.

PART 2 PRODUCTS

2.01 BATT INSULATION AND FASTENERS

- A. Physical Characteristics:
 - 1. Fiberglass or Mineral Wool Batts:
 - a. Batt Insulation: ASTM C665, Type II, Class C, with 1 perm rating, nonreflective kraft paper vapor-resistant membrane laminated to one side.
 - b. Sound Attenuation Blankets: ASTM C665, Type I, with no vapor retarder with R-values as shown.
 - c. Formaldehyde free.
- B. Functional Characteristics:
 - 1. Fasteners: As recommended by insulation manufacturer.
 - 2. Tape: As recommended by insulation manufacturer.
- C. Performance Characteristic: Recycled Content (Pre-consumer): 20 percent minimum.

2.02 SILL SEALER

- A. Manufacturers and Products:
 - a. Owens Corning; FoamSealR Gasket.
 - b. Or equal.

B. Physical Characteristics:

1. Polyethylene Foam:
 - a. Size: 3-1/2 inches wide.

C. Functional Characteristics: Capable of compressing to seal gaps and reduce air infiltration; moisture and insect resistant.

D. Performance Characteristics:

1. Water Vapor Transmission (ASTM E96/E96M): 0.209 perms maximum.
2. Mold Testing (ASTM G21): Does not support mold growth.
3. Compression Set (ASTM D3575): 29.8 percent.

2.03 RIGID INSULATION

A. Manufacturers and Products:

1. Kingspan; GreenGuard GG25-LG XPS Insulation Board.
2. Or equal.

B. Physical Characteristics:

1. Extruded Polystyrene (XPS) Foam:
 - a. ASTM C578, Type IV.
 - b. R-Value: R-15 minimum (R-5 per inch minimum).

C. Functional Characteristics:

1. Adhesives and Fasteners: As recommended by insulation manufacturer.

D. Performance Characteristics:

1. Flame Spread: Less than 25 when tested in accordance with ASTM E84.
2. Compressive Strength:
 - a. Foundation: Minimum of 25 psi at 10 percent deformation in accordance with ASTM D1621.
 - b. Recycled Content (Pre-consumer): 20 percent minimum.
 - c. Global Warming Potential (of blowing agent): 50 or less.

2.04 INSULATING SHEATHING

A. Manufacturers and Products:

1. Dupont; Thermax Sheathing.
2. Or equal.

B. Physical Characteristics:

1. Polyisocyanurate foam core board with aluminum skin bonded to both faces.
 - a. Sheet Size: 4 feet by 8 feet.
 - b. R-Value: R-9 minimum (R-4.5 per inch minimum).

C. Functional Characteristics:

1. Adhesives and Fasteners: As recommended by insulation manufacturer.

D. Performance Characteristics:

1. Flame Spread: Less than 25 when tested in accordance with ASTM E84.
2. Compressive Strength: Minimum of 25 psi at 10 percent deformation in accordance with ASTM D1621.
3. Water Vapor Transmission: Less than 0.01 perm in accordance with ASTM E96.

2.05 FACED INSULATION BOARD

A. Manufacturers and Products:

1. Dupont; Thermax Heavy Duty.
2. Or equal.

B. Physical Characteristics:

1. Glass fiber reinforced polyisocyanurate foam plastic core.
 - a. Faced on exposed side with 4-mil white acrylic-coated aluminum sheet laminated over foil and faced on reverse side with 1.25-mil reflective foil.
 - b. R-Value: R-11.4 minimum (R-6 per inch minimum).

C. Functional Characteristics:

1. Adhesives and Fasteners: As recommended by insulation manufacturer.

D. Performance Characteristics:

1. Flame Spread: Less than 25 when tested in accordance with ASTM E84.
2. Compressive Strength: Minimum of 25 psi at 10 percent deformation in accordance with ASTM D1621.
3. Water Vapor Transmission: Less than 0.01 perm in accordance with ASTM E96.

2.06 SPRAY FOAM INSULATION

A. Manufacturers and Products:

1. Carlisle; SealTite Pro One Zero.
2. Or equal.

B. Physical Characteristics: General purpose, closed cell, semi-rigid, two-component medium density polyurethane foam.

C. Functional Characteristics: None.

D. Performance Characteristics:

1. Thermal Resistance (ASTM C518): R 6.9 per inch thickness.
2. Core Density (ASTM D1622): 2 pcf.
3. Water Vapor Permeance (E96): 0.8 perm-in.
4. Air Barrier Assembly at 75 Pa (E2178): 0.02 L/sM2 at 1 inch.
5. Fire Resistance (ASTM E84).
6. Flame Spread: 25 or less.
7. Smoke Developed: 450 or less.
8. Global Warming Potential: Less than one.
9. Ozone Depletion Potential: Zero.

2.07 FACED PERIMETER INSULATION BOARD

A. Manufacturers and Products:

1. Clear Corporation; WallGUARD.
2. Or equal.

B. Physical Characteristics:

1. Panels: Extruded polystyrene rigid insulation with factory applied 5/16-inch thick latex-modified concrete facing. Tongue and groove side edges to allow for side-to-side installation using factory edge.
 - a. Thermal Resistance (R-value) per Inch (ASTM C518): 5.0.
 - b. Compressive Strength (ASTM D1621): 40 psi.
2. Clips: Galvanized steel mounting clips designed to support panels for Project design loads.

C. Functional Characteristics: None.

D. Performance Characteristics:

1. Water Absorption (ASTM D2842): Less than 0.7 percent by volume.
2. Water Vapor Permeance (ASTM E96): 0.8 maximum.

3. Surface Burning Characteristics (ASTM E84):
 - a. Flame Spread Index: 5 or less.
 - b. Smoke Developed Index: 135 or less.

PART 3 EXECUTION

3.01 BATT INSULATION

- A. Install in accordance with manufacturer's instructions and as specified below:
 1. Install in widths required by framing spacing.
 2. Fit tightly to ensure continuous seal.
 3. Where electrical outlets, ducts, pipes, vents, or other utility items occur, place insulation on cold weather side of obstruction.
 4. Protect installed insulation from tears and other damage until covered with finish material.
 5. Remove and replace damaged material.

3.02 SILL SEALER

- A. Install under metal track of exterior furring walls resting on concrete slab.

3.03 RIGID INSULATION

- A. Install in accordance with the following:
 1. Install boards in location and in R-value as shown.
 2. Cut insulation with saw, knife, or other sharp tool to fit tightly around obstructions.
 3. Butt insulation boards together tightly at joints.
 4. Where thickness required exceeds 1-1/2 inches, install two layers of boards.
 5. Apply to masonry or concrete with fasteners recommended by insulation manufacturer.

3.04 INSULATING SHEATHING

- A. Install in accordance with the following:
 1. Apply with long dimension perpendicular to supports.
 2. Abut ends of sheathing at centers of supports.
 3. Stagger end joints where applicable.
 4. Attach sheathing to CMU with fasteners as recommended by sheathing manufacturer.

3.05 FACED INSULATION BOARD

- A. Install, in sizes as large as possible, in accordance with manufacturer's recommendations, and as specified below:
 - 1. Mechanically fasten PVC base strips to wall securely using fasteners recommended by insulation manufacturer.
 - 2. Apply insulation board using PVC T-strips at board joints.
 - 3. Securely interlock T-strips with base strips making finished appearance plumb, level, and symmetrically placed on each wall.
 - 4. Provide manufacturer's standard interlocking PVC strips for mounting boards and covering joints.

3.06 SPRAY FOAM INSULATION

- A. Surface Preparation: Free of dirt, grease, oil, loose paint, excessive rust scale, or other foreign material, which would prevent adequate adhesion.
- B. Ambient Temperature: Between 25 degrees F and 120 degrees F throughout application process.
- C. Application:
 - 1. Apply in accordance with manufacturer's instructions.
 - 2. Apply spray foam insulation in locations as shown and as required to maintain a continuous building envelope air barrier.
- D. Cleaning: Clean overspray from adjacent surfaces in accordance with manufacturer's recommendations.

3.07 FACED INSULATION BOARD

- A. Install faced insulation board panels over perimeter cast-in-place concrete foundation walls and liquid-holding structures using mounting clips at locations shown on the Drawings. Prepare concrete surfaces and furnish mounting clips at spacing required by manufacturer's installation instructions.

END OF SECTION

