

SECTION 072100 – THERMAL INSULATION

PART 1 – GENERAL

1. SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board.
2. Glass-fiber blanket.
3. Spray Foam
4. Acoustic Batts

2. ACTION SUBMITTALS

- A. Product Data: For each type of product.

3. INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Research reports.

4. CRITERIA

- A. Single-Source Responsibility for Insulation Products: Require each type of building insulation be obtained from a single source with resources to provide products complying with requirements indicated without delaying the Work.**
- B. Fire-Test-Response Characteristics: Insulation and related materials shall be specified with the fire-test-response characteristics, as determined by testing, identical products per test method indicated below. 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.**
- C. Provide a 15-year written warranty be provided stating that the actual thermal resistance of the extruded polystyrene insulation will not vary by more than 10% from its published thermal resistance.**
- D. All perimeter walls shall be insulated full height and sealed tight against air infiltration at the deck using spray foam insulation.**

- E. No exposed insulation is permitted within a plenum air space.

PART 2 – PRODUCTS

1. INSULATION APPROVED MANUFACTURERS:

1. Formaldehyde-Free Building Insulation:
 - a. Johns-Manville (Basis of design).
2. Extruded-Polystyrene Board Insulation:
 - a. Dow Chemical Co. (Basis of design).
3. Formaldehyde-free concealed sound control batts:
 - a. Johns-Manville (Basis of design).
4. Closed-cell Spray Polyurethane Foam Insulation with separate Ignition Barrier Coating:
 - a. Johns-Manville (Basis of design).

2. FACED BATTS (IN WALL CAVITY INSULATION)

B. Formaldehyde-free™ FSK-25 Faced Batt:

1. Thermal Resistance (R-Value) (ASTM C518): R-13 MINIMUM
2. Combustion Characteristics (ASTM E136): Pass.
3. Critical Radiant Flux (ASTM E970): Greater than 0.11 Btu/ft² × s (0.12 W/cm²).
4. Water Vapor Permeance (ASTM E96): 0.05 perm (3 ng/Pa × s × m²).
5. Water Vapor Sorption (ASTM C1104): 5% or less.
6. Odor Emission (ASTM C1304): Pass.
7. Corrosiveness (ASTM C665, 13.8): Pass.
8. Fungi Resistance (ASTM C1338): Pass.
Glass-Fiber Blanket, Unfaced: 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.
9. Recycled Content: Certified by Scientific Certification Systems to contain minimum of 20% post-consumer and 5% pre-consumer recycled glass product, on average of manufacturer's products.
10. Prove through documentation that product passes CIWMB Section 01350 for indoor air quality.
11. Flamespread (ASTM E84): 25, maximum.
12. Smoke Developed (ASTM E84): 50, maximum.
13. Material Standard: ASTM C665, Type III, Class A, Category 1.

3. CONTINUOUS (EXTERIOR WALL INSULATION)

- A. Rigid wall insulation shall be Expanded Extruded Polystyrene board, nominally **48" x 96" x 1 ½ inches**, unless otherwise indicated.
- B. Insulation shall meet or exceed the following test requirements and results: EPS shall comply with ASTM C578, Type IV, Federal Specifications HH I 524C Type (I or II) and tested in accordance with ASTM C578 or UL723, with a flame spread of less

than 25 and smoke development of less than 450 as required by the applicable building codes.

- C. Minimum allowable density shall be 1.0 PCF in accordance with ASTM C177, thermal conductivity shall provide a K factor of .24 at 40 degrees Fahrenheit and .26 at 75 degrees Fahrenheit.
- D. Insulation board shall be aged. If air dried, insulation board shall be aged for not less than six weeks in block form prior to cutting and shipping. Other methods of aging shall be equivalent to six weeks aged (air dried) insulation board and certified as equivalent by insulation board manufacturer.
- E. Variations in tolerances in dimensions of insulation board shall be minimized.
- F. All insulation board shall be labeled on each package to provide information required by Applicable Codes.
- G. Extruded-Polystyrene Board Insulation: Rigid closed cell extruded polystyrene thermal board insulation. Comply with ASTM C 578-95 and with other requirements indicated below:**
 - 1. **Type IV, density 1.6 lb/cu. ft. min., compressive strength 25 psi (ASTM D 1621-94).**
 - 2. **Thermal resistance: 5-year aged R-values of 5.4 and 5.0 min. deg F-ft²-h/Btu²/inch at 40deg F and 75deg F respectively (ASTM C 518-91).**
 - 3. **Water absorption: Max 0.1% by volume (ASTM C 272-91(96)).**
 - 4. **Surface-Burning Characteristics:**
 - a. **Flame-spread: 5.**
 - b. **Smoke Developed: 165.**
 - 5. **Thickness: 1-1/2" (R-7.5)**
 - 6. **Acceptable manufacturer's product: The Dow Chemical Company "STYROFOAM CAVITYMATE Plus" material.**

5. SOUND CONTROL BATTS

- B. Formaldehyde-Free Sound Control Batts: comply with requirements indicated below:**
 - 1. **Thickness: 3-5/8" in partitions and 6-1/2" over ceilings. Refer to Gypsum Board assemblies for additional requirements.**
 - 2. **Noncombustible per ASTM E136.**
 - 3. **Recycled Content: Certified by Scientific Certification Systems to contain minimum of 20% post-consumer and 5% pre-consumer recycled glass product, on average of manufacturer's products.**
 - 4. **Prove through documentation that product complies with CIWMB Section 01350 for indoor air quality.**
 - 5. **Flamespread (ASTM E84): 25 or less.**
 - 6. **Smoke Developed (ASTM E84): 50 or less.**

6. SPRAY FOAM INSULATION

B. JM Corbond III Closed-cell Spray Polyurethane Foam with separate Ignition Barrier Coating:

1. **Nominal Density (ASTM D1622): 2.0 lb/cu ft.**
2. **Compressive Strength (ASTM D1621): 25 psi.**
3. **Closed-cell Content (ASTM D1940): >90%.**
4. **R-value (ASTM C518-initially): 6.6**
5. **R-value (ASTM C1029-07-180 day aged): 6.4**
6. **Water Absorption (ASTM D2842): 0.020 gm/cc**
7. **Water Vapor Transmission (ASTM E96): 0.61 perms @ 1.5"**

7. 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.

B. Insulation Anchors, Spindles, and Standoffs: As recommended by manufacturer.

C. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

D. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.

8. OTHER PRODUCTS

A. Sill sealer shall be fiberglass sill sealer.

B. Fastening devices and/or adhesives shall be as standard with or as recommended by the manufacturer.

C. Mastic sealer shall be a type recommended by insulation manufacturer for bonding edge joints between units and filling voids in the Work.

D. Safing insulation shall be a mineral fiber product conforming to ASTM C665 or a ceramic fiber conforming to ASTM C892 of thickness tested for application as shown on the drawings.

1. Insulation shall be one of the following:
 - a. USG Thermafiber Safing insulation.
 - b. Manville Pyro-Fiber Safing insulation.
 - c. Sohio Carborundum Durablanket FP insulation.

- E. Acoustical Ceiling Batts: Provide 24 x 48 paperless R11, 3½" , semi-rigid spun mineral fiber R-11, sizes as required in accordance with ASTM C 665, ASTM C653 and ASTM C518.
 1. Acceptable Manufacturers:
 - a. Johns Manville
 - b. Owens-Corning Fiberglass Corp.
 - c. U.S. Gypsum

PART 3 – EXECUTION

1. 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.

2. INSTALLATION OF CAVITY-WALL INSULATION

- A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches (610 mm) o.c. both ways on inside face and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.
 1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 04 2613 "Masonry Veneer."

3. ABOVE CONCRETE SLAB UNDER RAISED FLOOR INSULATION

- A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches (610 mm) o.c. both ways on inside face and as recommended by manufacturer. Fit courses of insulation between raised floor posts and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.

4. 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 (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
- 6. For wood-framed construction, install blankets according to ASTM C 1320.

- 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.

5. Rigid Insulation:

- A. Install insulation only when construction has advanced to the point that remaining construction operations will not damage the insulation. Remove and replace damaged insulation.

- 1. Seal all joints between closed-cell (non-breathing) rigid insulation units by applying mastic sealer to the edges of each unit to form a tight seal as units are installed. Fill voids in completed installation with mastic or sealant.

- B. Where electric outlets, ducts, pipes, vents, or other utility items occur, place insulation on the cold or weather side of the obstruction.

1. Install rigid insulation without gaps over entire surface to be insulated.
2. Secure rigid wall insulation with adhesives or mechanical fasteners as required by manufacturer's recommendations. Cut to lines as required for flashing installation. Fit insulation tightly around penetrations and pack remaining voids with batt insulation.
3. Stagger insulation joints.
4. Edges of roof insulation shall be supported by the top flat surface of the metal deck.
5. Fasteners used to secure the roof insulation shall penetrate the top flat surface of the metal deck.
6. The roofing contractor shall provide the manufacturer's recommended fastening pattern for securing the roof insulation to the metal deck.

6. PROTECTION OF MATERIAL FROM DAMPNESS

- A. At the time construction materials are received on site, they shall be inspected for dryness, and any material not completely free of dampness shall be rejected and replaced prior to being set into the building areas. If materials are to be stored on site prior to use in construction, they shall be stored on pallets, clearly and visibly off the ground and away from any ponding or puddling of ground water. The stored material shall further be completely protected from rain and other moist weather with plastic sheeting or tarps, which shall be adequately vented to avoid condensation build-up. The use of manufacturer's plastic wraps as the sole means of protection is not acceptable. Once built into the construction, even though the building may not be dried-in, the materials shall be protected from becoming wet by rain or other moist weather with plastic sheeting.

END OF SECTION 072100