SECTION 07 2100

THERMAL INSULATION

PART 1 GENERAL

1.1 SUMMARY

A. Provide thermal insulation work as indicated on Drawings, and as specified, including but not limited to:

1. Fiberglass blanket/batt insulation.
2. Mineral wool insulation.
3. Foam plastic board insulation.
4. Polyisocyanurate board insulation.
5. Vapor retarder.
6. Other building insulation work as may be called for on Drawings and not indicated or specified to be included under other Sections.

B. Related Documents and Sections: Examine Contract Documents for requirements that directly affect or are affected by Work of this Section. Other Documents and Sections that directly relate to work of this Section include, but are not limited to:

1. General provisions of the Contract, including General and Supplementary Conditions, and Division 01 General Requirements Specification Sections.
2. Section 07 2119 - FOAMED-IN-PLACE INSULATION.
3. Section 07 5556 - FLUID-APPLIED MEMBRANE ROOFING.
4. Section 07 5557 - INTENSIVE GARDEN ROOF ASSEMBLY.
5. Section 09 2116 - GYPSUM BOARD ASSEMBLIES.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's printed descriptions of materials and systems, performance criteria, use limitations, recommendations and installation information.

1. Each product, including but not limited to insulation, adhesive, tape, vapor retarder, film.
2. R-Value of each insulation type per inch, aged (LTTR).

B. Quality Assurance Submittals

1. Test Reports.
2. Certificates:
   a. Certify that firesafing materials used are fireproof, inorganic and free of carcinogenic mineral fibers or toxic substances.
3. Manufacturer’s Installation Instructions.
4. Qualification Statements.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum five (5) years documented experience.
2. Applicator: Company specializing in performing the work of this section with minimum three (3) years documented experience.

B. Regulatory Requirements:

1. Surface-Burning Characteristics: ASTM E84.
2. Fire-Resistance Ratings: ASTM E119.
3. Combustion Characteristics: ASTM E136.

C. Source Limitations: Obtain each type of insulation and related accessories through one source from a single manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be delivered to site in original, unopened packages or containers bearing manufacturer's names, brand names, and types and thicknesses of contents.

B. Store off floor in interior spaces, adequately protected against damage from all sources.

PART 2 PRODUCTS

2.1 FIBERGLASS BLANKET/BATT INSULATION

A. Glass-Fiber Blanket Insulation

1. Manufacturers. Subject to requirements select products from the following:
   a. CertainTeed Corporation.
   b. Guardian Fiberglass, Inc.
   c. Johns Manville.
   d. Knauf Fiber Glass.
   e. Owens Corning.

B. 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.

C. Glass-Fiber Blanket, Kraft Faced: ASTM C 665, Type II (nonreflective faced), Class C (faced surface not rated for flame propagation); Category 1 (membrane is a vapor barrier).

2.2 MINERAL WOOL INSULATION

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Roxul.
2. Fibrex Insulations Inc.
3. Owens Corning.
4. Thermafiber.

B. Unfaced, Mineral-Wool Board Exterior Cavity Insulation: ASTM C612 Type IVB; with the following characteristics:

1. Fire Performance:
   a. Non-combustibility: To CAN/ULC S114.
   b. Maximum use temperature: 650 deg C.
   c. Surface Burning Characteristics: To CAN/ULC S102.
   d. Flame spread: 0.
   e. Smoke developed: 5.
2. Thermal resistance (RSI value/25.4 mm at 24 deg C: 0.76 m2K/W to ASTM C518.

3. Water vapour permeance: 1555 ng/Pa.s.m2 minimum.
4. Moisture sorption: 1 % maximum to ASTM C1104/C1104M.
5. Fungi resistance: Zero mould growth to ASTM C1338.
6. Corrosive resistance:
    a. Steel to ASTM C665: Pass.
    b. Stainless steel to ASTM C795: Conforms.

C. Unfaced, Mineral-Wool Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

D. Unfaced, Semi-Rigid, Mineral-Wool Board Insulation: ASTM C 726; Dual-density mineral wool board insulation with a rigid top layer for durability and enhanced strength; Zero flame-spread and smoke-developed indexes per ASTM E 84; Class A per ASTM E 108.

2.3 FOAM PLASTIC BOARD INSULATION

A. Polystyrene, Extruded Board Insulation: ASTM C578, of type and density indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively:

1. R-Value: Minimum 5.0 per ASTM C518 at 75F.
2. Type IV, 25 psi compressive strength.
    a. Locations: Under slabs and at foundations below grade, as indicated.
3. Type VI, 40 psi compressive strength.
    a. Locations: At built-up slabs, below grade at occupied spaces, and other locations as indicated.
4. Type VII, 60 psi compressive strength.
    a. Locations: Beneath pedestal-supported pavers.

B. Polyisocyanurate Board, Foil Faced: ASTM C 1289, foil faced, Type I, Class 1 or 2.

1. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.4 AUXILIARY INSULATING MATERIALS

A. Spray Foam Gap-Sealing Insulation: Non- expanding and expanding polyurethane spray foam.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    a. Pur Fill.
    b. Hilti.
    c. Touch-N-Foam.
    d. Architect acceptable equivalent.

B. Adhesive for Bonding Insulation: Product recommended by insulation manufacturer with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.

C. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:

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.

PART 3 EXECUTION

3.1 EXAMINATION

A. Carefully examine areas with Installer present, for compliance with requirements affecting Work performance.

1. Verification of Conditions: Verify that field measurements, surfaces, substrates, structural support, utility connections, tolerances, humidity, cleanliness and other conditions are as required, and ready to receive Work.
    a. Test substrate as required by manufacturer to verify proper conditions.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written installation instructions for preparing substrates.

1. Protect adjacent surfaces from damage due to insulation installation.
2. Protect adjacent surfaces from damage due to spray or foam insulation installation.

3.3 INSTALLATION – GENERAL

A. Install insulation in accordance with manufacturer’s written application instructions, and as specified.

B. Install rigid insulating units with joints close and flush, in regular courses and with cross-joints overlapping.

1. Align and space rigid insulation joints with building movement joints.
2. Seal perimeter and around penetrations with compatible materials as recommended by manufacturer.

3.4 SPRAY-APPLIED INSULATION

A. Apply spray-applied insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.

B. Application - Thermal Barrier: Prior to applying coating, check polyurethane foam with a moisture resistance meter to ensure that foam is dry. Apply thermal barrier coating between the temperature ranges of 50 and 110 degrees F, ambient.

3.5 INSTALLATION OF VAPOR RETARDERS ON FRAMING

A. Place vapor retarders on side of construction indicated on Drawings.

B. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives, vapor retarder fasteners, or other anchorage system as recommended by manufacturer. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

C. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs and sealing with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Locate all joints over framing members or other solid substrates.

D. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.

E. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.6 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, or other causes.

1. 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

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