

SECTION 07212

SPRAYED FOAM INSULATION FOR COLD STORAGE FACILITIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sprayed polyurethane foam insulation with vapor retarder.
- B. Thermal barrier (fire resistive) coating.

1.2 RELATED SECTIONS

- A. Section 03300 - Cast-In-Place Concrete: Cold storage rooms floor slabs over foam insulation.
- B. Section 07570 - Coated Foamed Roofing: Spray polyurethane foam on exterior side of roof decks.
- C. Section 07600 - Flashing and Sheet Metal: Metal trim and flashings associated with insulation.
- D. Division 15 - Mechanical: Plumbing and HVAC components penetrating insulation.
- E. Division 16 - Electrical: Electrical components penetrating insulation.

1.3 REFERENCES

- A. ASTM C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
- B. ASTM C 518 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- C. ASTM D 1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
- D. ASTM D 1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.
- E. ASTM D 2856 - Standard Test Method for Open-Cell Content of Rigid Cellular Plastics by the Air Pycnometer.
- F. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

- G. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
- H. SPI bulletin AX-119 - MDI-Based Polyurethane Foam Systems: Guidelines for Safe Handling and Disposal; Society of the Plastics Industry, Inc., Spray Polyurethane Foam Division.
- I. SSPC-SP 6 - Commercial Blast Cleaning (Part of Painting Manual, Volume 2); Steel Structures Painting Council.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data on products to be installed.
 - 1. Application or installation instructions.
 - 2. Listing, classification, and approval certifications.
 - 3. Safety and handling instructions for storage, handling and use of the materials.
- C. Certifications: If manufacturer's published data sheets do not indicate compliance with all specification requirements, provide letter of certification that all products comply with the specification requirements; include primers (if required), foam and coatings.
- D. Shop Drawings: Show materials and details of fabrication of sheet metal, accessories, or other fabricated items.
- E. Qualification Statements:
 - 1. Manufacturer qualifications.
 - 2. Installer qualifications.
 - 3. Independent inspector qualifications.
- F. Applicator's Field Quality Control Procedures: Written description of procedures to be utilized to insure proper preparation and installation of foam and coatings, detail work and follow-up inspection.
- G. Maintenance Data: Manufacturers' recommended protection, cleaning, and repair procedures, including recommended frequency of inspection.
 - 1. Include proposal for annual inspection program.

1.5 QUALITY ASSURANCE

- A. Foam and Coating Manufacturer Qualifications: Firms which can show evidence of ability to manufacture the products specified and sufficient financial resources and manufacturing facilities to furnish materials on this project; evidence required includes references, past project descriptions, specimen warranty, product data, test data, and code approvals.
- B. Installer Qualifications: A firm with experience installing insulation systems of the type specified.
 - 1. Show contractor level accreditation by SPI SPFD Accreditation Program.
 - 2. Approved or certified by the foam manufacturer as qualified to install the specified system.
 - 3. Provide information concerning projects similar in nature to the one proposed including location and person to be contacted.
- C. Manufacturer Field Representation: Provide qualified representatives of the foam and coating manufacturers to monitor and inspect the installation of their products.
- D. Independent Inspection: Provide inspection of the installation by a qualified SPI SPFD inspector member.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Provide materials packaged in the manufacturer's original, tightly sealed containers or unopened packages, clearly labelled with the manufacturer's name, product identification, safety information, and batch or lot numbers where appropriate. Where materials are covered by a referenced specification, the labels shall bear the specification number, type and class, as applicable.
- B. Store materials out of the weather and out of direct sunlight in locations where the temperatures are within the limits specified by the manufacturer.

1.7 PROJECT CONDITIONS

- A. Comply with the manufacturer's instructions and recommendations as to handling and safety procedures.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide products manufactured by Foam Enterprises, Inc., 13630 Water Tower Circle, Minneapolis, MN 55441. ASD. Tel: (800) 888-3342. Fax: (612) 559-0945.
- B. Substitutions are not acceptable.
- C. Submit requests for substitutions in accordance with provisions of Section 01600.

2.2 MATERIALS

- A. Foam: Sprayed-in-place two-component closed-cell polyurethane made by combining an isocyanate (A) component with a polyol (B) component, with the following physical characteristics:
 - 1. Density in place, when tested in accordance with ASTM D 1622: ___ lb/cu ft (___ kg/cu m).
 - 2. Compressive Strength, when tested in accordance with ASTM D 1621: ___ psi (___ Pa), minimum.
 - 3. Closed Cell Content, when tested in accordance with ASTM D 2856: ___ percent, minimum.
 - 4. Thermal Conductivity ("K"), when measured in accordance with ASTM C 177 or C 518: _____.
 - 5. Flame Spread Index, when tested in accordance with ASTM E 84: Less than 75.
 - 6. Smoke Developed Index, when tested in accordance with ASTM E 84: Less than 450.
- B. Primers: As recommended by the manufacturer of the spray foam materials specified.
- C. Vapor Retarder: Fluid-applied coating, _____.
 - 1. Moisture Vapor Transmission: 0.01 perm or less, when tested in accordance with ASTM E 96, Method D.
- D. Thermal Barrier: Sprayed or fluid-applied coating, _____.
 - 1. Fire Resistance: 15 minute rating.
- E. Insulation Boards: Type, size, and thickness as required; stagger joints of multiple layers.
- F. Flashings and Waterproof Coverings for Expansion Joints: Compatible with the foam and coating systems and as recommended by manufacturer.
- G. Other Materials Used in System: Selected for compatibility with insulation materials and as recommended by the manufacturer; including, but not limited to, adhesives, sealing and caulking compounds, metal flashings, vents and drains.

PART 3 EXECUTION

3.1 GENERAL

- A. Comply with the instructions and recommendations of the foam and coatings manufacturers.
- B. Familiarize all installers with correct and safe application and handling procedures:
 - 1. See SPI Bulletin AX- 119, "MDI-Based Polyurethane Foam Systems: Guidelines for Safe Handling and Disposal."
 - 2. Refer to appropriate Materials Safety Data Sheets (MSDS) for additional safety information.

3.2 DESCRIPTION OF INSULATION AND SEQUENCE OF CONSTRUCTION

- A. Due to the need for coordination with installation of other building components, the installation of insulation cannot be accomplished in a single operation. Sequence installation as follows:
- B. Freezer Floors: Insulation thickness of ____ inch (____ mm).
 - 1. Apply vapor retarder and sprayed foam insulation to base of columns.
 - 2. Install heated mechanical equipment and vent pipes.
 - 3. Pour base slab (recess to allow for thickness of insulation).
 - 4. Allow new concrete to cure a minimum of 28 days before applying vapor retarder.
 - 5. Apply vapor retarder and sprayed foam insulation.
 - 6. Secure slip sheet and pour concrete wearing slab.
- C. Walls: Insulation thickness of ____ inch (____ mm).
 - 1. Complete all penetrations through walls before vapor retarder and sprayed foam are applied.
- D. Ceilings: Insulation thickness of ____ inch (____ mm).
 - 1. Insulate hanger rods for distance of 4 times the ceiling insulation thickness measured from the outside face of the insulation.
- E. Doors: Insulation thickness of ____ inch (____ mm).
- F. Complete all insulation and thermal barrier work prior to activation of refrigeration equipment.

3.3 PREPARATION

- A. Ferrous Metal: Sandblast iron and steel surfaces which are not primed, shop painted, or otherwise protected in accordance with SSPC SP-6. Remove loose rust and unsound primer from shop primed iron and steel surfaces by scraping or wire brushing.
- B. Non-Ferrous Metal: Clean galvanized metal, aluminum, and stainless steel surfaces as recommended by the manufacturer of materials to be applied.
- C. If metal surface is free of loose scale, rust, weathered or chalking paint, clean using compressed air jet, vacuum equipment, and hand or power broom to remove loose dirt. Remove grease, oil and other contaminants using proper cleaning solutions.
- D. New Concrete: Allow to cure for twenty-eight (28) days prior to the application of primer or foam.
- E. Previously Painted Surfaces: Remove all paint.
- F. Remove loose dirt, dust and debris by using compressed air, vacuum equipment or brooming. Remove oil, grease, form release agents, laitance, and other contaminants using proper cleaning solutions. Do not wash wood or porous materials with water.
- G. Grout, tape, or calk all joint openings that exceed 1/4 inch (6 mm) in width.
- H. Prime all metal as recommended by manufacturer.
- I. Prime all concrete surfaces.
- J. Prime all untreated and unpainted wood surfaces with an exterior grade primer.

3.4 VAPOR RETARDER INSTALLATION

- A. Apply vapor retarder in accordance with the manufacturer's specifications and instructions.
- B. Apply vapor retarder to all surfaces to be insulated in a continuous film across corners and junctions.
 - 1. Extend 6 inches beyond where the insulation will end.
 - 2. Metal surfaces do not require vapor retarders, but seams and penetrations must be sealed.

- C. Allow vapor retarder to cure before the sprayed foam insulation is applied.
- D. Repair damage and defects to the vapor retarder prior to the application of foam insulation.
- E. Keep vapor retarder free of moisture, frost, debris, and contaminants that might impair the adhesion of the foam insulation.

3.5 FOAM APPLICATION

- A. Do not begin application of foam until all preparation requirements have been completed.
- B. Do not apply foam when the temperature is below or the humidity is above that specified by the manufacturer for ambient air and substrate.
- C. Apply foam in accordance with the manufacturer's specifications and instructions.
- D. Apply foam with minimum pass thickness of 1/2 inch (13 mm) and maximum pass thickness of 1 inch (25 mm), unless greater pass thickness is acceptable to foam manufacturer.
- E. Apply foam uniformly over the entire surface with a tolerance of plus 1/4 inch per inch (6 mm per 25 mm) of thickness minus 0 inch (0 mm), except where variations are required to conform to building structure or to insulate around projections, door jambs, and corners.
- F. Penetrations Through Insulation:
 - 1. Insulate conduits, pipes less than 2 inches in diameter, and hanger rods that project through the insulation with spray foam for a distance of four times the regular wall insulation thickness.
 - 2. Insulate columns and pipes larger than 2 inches in diameter with spray foam for a distance of 4 feet from the wall, ceiling or floor.
 - 3. For insulated metal ducts add spray foam insulation of one half the thickness of the wall or ceiling insulation.
- G. Complete the full thickness of foam in any area prior to the end of each day. If the full thickness is not

completed in one day, prepare the surface in accordance with the recommendations of the manufacturer.

- H. Finish the final sprayed foam surface to a finish suitable for application of the thermal barrier. Remove unsuitable surfaces and reapply to an acceptable surface.
- I. Allow the foam surface to cure sufficiently.
- J. Repair damage and defects to the surface prior to the thermal barrier application.

3.6 THERMAL BARRIER APPLICATION

- A. Apply thermal barrier over entire surface of foam.
- B. Allow thermal barrier to cure. Inspect for defects and repair defects prior to subsequent coats.

END OF SECTION