

**SECTION 07 22 00**  
**ROOF AND DECK INSULATION**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Installation of roof and deck insulation on new construction ready to receive roofing membrane.

**1.2 RELATED WORK**

- A. Batt or blanket insulation: Section 07 21 13, THERMAL INSULATION.
- B. Sheet metal components: Section 07 60 00, FLASHING AND SHEET METAL.

**1.3 QUALITY CONTROL**

- A. Supervision of work by persons that are knowledgeable and experienced in roofing. See submittals for documentation of supervisors qualification.
- B. Unless specified otherwise, comply with the recommendations of the NRCA "Roofing and Waterproofing Manual" applicable to insulation for storage, handling, and application.

**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Roofing cement, each type
  - 2. Roof insulation, each type
  - 3. Fastening requirements
  - 4. Insulation span data for flutes of metal decks
- C. Samples:
  - 1. Roof insulation, each type
  - 2. Nails and fasteners, each type

D. Shop Drawings

1. Submit manufacturer's shop drawings indicating complete installation details of tapered insulation system, including cover board, including identification of each insulation block, sequence of installation, layout, drain locations, roof slopes, thicknesses, crickets and saddles.
2. Shop drawing shall include: Outline of roof, location of drains, complete board layout of tapered insulation components, thickness and the average "R" value for the completed insulation system.

E. Certificates:

1. Indicating type, thickness and thermal conductance of insulation. (Average thickness for tapered insulation).
2. Indicating materials and method of application of insulation system on metal decks meet the requirements of Factory Mutual Research Corporation for Class 1 Insulated Steel Deck Roofs.

F. Laboratory Test Reports: Thermal values of insulation products.

G. Layout of tapered roof system showing units required.

H. Documentation of supervisors training and experience showing knowledge of roofing procedures.

**1.5 DELIVERY, STORAGE AND MARKING**

A. Deliver materials to the site in original sealed packages or containers marked with the name and brand, or trademark of the manufacturer or seller.

B. Keep materials dry, and store in dry, weathertight facilities or under canvas tarps. Use of polyethylene or plastic tarps to cover materials is not permitted. Store above ground or deck level on wood pallets. Cover ground under stored materials with plastic tarp.

1. Store rolled materials (felts, base sheets, paper) on end. Do not store materials on top of rolled material.
2. Store foam insulation away from areas where welding is being performed and where contact with open flames is possible.

C. Protect from damage from handling, weather and construction operations before, during, and after installation.

## 1.6 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced.  
The publications are referenced in the text by the basic designation only.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. American Society for Testing and Materials (ASTM):
  - C1289..... Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
  - F1667 ..... Driven Fasteners: Nails, Spikes, and Staples
- D. Factory Mutual Global (FM):
  - 1-28..... Winds Loads to Roof Systems and Roof Deck Securement
  - P7825 ..... Approval Guide
- E. National Roofing Contractors Association (NRCA):  
The NRCA Roofing Manual 2009
- F. Underwriters Laboratories, Inc. (UL):  
Fire Resistance Directory (2009)

## 1.7 QUALITY ASSURANCE:

- A. Roof insulation on combustible or steel decks shall have a flame spread rating not greater than 75 and a smoke developed rating not greater than 150, exclusive of covering, when tested in accordance with ASTM E 84. Insulation bearing the UL label and listed in the UL Building Materials Directory as meeting the flame spread and smoke developed ratings will be accepted in-lieu-of copies of test reports. Compliance with flame spread and smoke developed ratings will not be required when insulation has been tested as part of a roof construction assembly of the type used for this project and the construction is listed as fire-classified in the UL Building Materials Directory or listed as Class I roof deck construction in the FM P7825. Insulation tested as part of a roof construction assembly shall bear UL or FM labels attesting to the ratings specified herein.

## **PART 2 - PRODUCTS**

### **2.1 INSULATION**

- A. Rigid Polyisocyanurate Board: ASTM C1289, Type I, Grade 2, 20 psi.
  - 1. Use two layers of insulation unless specified otherwise.
  - 2. Do not use phenolic or urethane board type insulation directly on steel roof decks.
  - 3. Use either 13 mm (1/2 inch) thick perlite board or mineral fiber board as a top layer isocyanurate board. Composite board is acceptable.
  - 4. Where tapered insulation is used, all insulation shall be factory tapered, except perlite board may be field tapered.
- B. Insulation Thickness:
  - 1. Thickness of roof insulation shown on drawings is nominal. Actual thickness shall provide the thermal resistance "R" value for uniform thickness (average thickness where tapered insulation is used).
  - 2. The minimum thickness of insulation for metal decks shall not be less than recommended by the insulation manufacturer to span the rib opening (flute size) of the metal deck used.
  - 3. When thickness of insulation to be used is more or less than that shown on the drawings, make adjustments in the alignment and location of roof drains, flashing, gravel stops, fascias and similar items at no additional cost to the Government.
  - 4. Where tapered insulation is used, the thickness of the insulation at high points and roof edges shall be as shown on the drawings; the thickness at the low point (drains) shall be not less than 38 mm (1-1/2 inches).
  - 5. Use not less than two layers of insulation when insulation is 25 mm (one inch) or more in thickness unless specified otherwise.
- B. Tapered Roof Insulation System Segments:
  - 1. Fabricate factory tapered, closed cell polyisocyanurate foam core bonded to heavy duty glass fiber mat facers. Use only one insulation material for tapered sections.
  - 2. Cut to provide high and low points with crickets and slopes as shown.
  - 3. Minimum thickness of tapered sections; 13 mm (1/2 inch), unless manufacturers allow taper to zero mm (inch).
- C. Tapered Edge Strips:

1. Tapered 1:12 (one inch per foot), from 0 mm (0 inches), 300 mm to 450 mm (12 inches to 18 inches) wide.
2. Perlite Board: ASTM C728.

## **2.2 FASTENERS**

- A. Fasteners for securing insulation to steel decks:
1. Conform to requirements of Factory Mutual Research Corporation for wind uplift.
  2. Self-drilling galvanized screws with 50 mm (two inch) diameter disk.
  3. Antibackout thread design.
  4. Have a pullout resistance of 14 kg (30 pounds) minimum.

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- A. Do not apply roof insulation if deck will be used for subsequent work platform, storage of materials, or staging or scaffolding will be erected thereon.
- B. Entire roof deck construction of any section of the building shall be completed before insulation system work is begun. Curbs, blocking, edge strips, and other components which insulation, roofing and base flashing is attached to shall be in place ready to receive insulation and roofing. Coordinate roof insulation operations with roofing and sheet metal work so that insulation is installed to permit continuous roofing operations.
- C. Insulation system materials shall be dry and damage free when applied. Do not use broken insulation or insulation with damaged facings. Remove damaged insulation from the site immediately.
- D. Dry out surfaces, including the flutes of metal deck, that become wet from any cause during progress of the work before roofing work is resumed. Apply materials only to dry substrates.
- E. Except for temporary protection specified, do not apply materials during damp or rainy weather, during excessive wind conditions, nor while moisture (dew, fog, snow, ice) or frost is present in any amount in or on the materials when temperature is below 10 ° C (50 ° F). Do not apply materials to substrate having temperature of 10 ° C (50 ° F) or less.

- F. Phased construction is not permitted. The complete installation of all flashing, insulation, and roofing shall be completed in the same day except for the area where temporary protection is required when work is stopped.

### **3.2 SURFACE PREPARATION**

- A. Sweep decks to broom clean condition. Remove all dust, dirt or debris.
- B. Remove projections that might damage materials.

#### **Steel Deck:**

1. Material and method of application of roofing systems used on metal decks shall meet the requirements of Underwriters Laboratories for Class A or Factory Mutual Research Corporation for Class I Insulated Steel Roof Deck.
2. Mechanically anchor a 25 mm (one inch) thick layer of mineral fiber board, cellular glass, or perlite board to meet the requirements of Factory Mutual Research Corporation for Class 1-60, Insulated Steel Deck Roofs.
3. Locate the long dimension edge joints to have solid bearing on top of decking ribs; do not cantilever over rib openings or flutes.

### **3.3 INSTALLATION OF INSULATION**

- A. Lay insulating units with close joints, in regular courses and with cross joints broken. When laid in more than one layer, break joints of succeeding layers of roof insulation with those in preceding layer a minimum of 6 inches.
- B. Lay units with long dimension perpendicular to the rolled (longitudinal) direction of the roofing felt.
- C. Cover all insulation installed on the same day by either:
  1. The roofing membrane as specified.
  2. Temporary protection as specified.
- D. Seal all cut edges at penetrations and at edges against blocking with bitumen or roof cement.
- E. Cut to fit tight against blocking or penetrations.
- F. Steel Deck:
  1. Material and method of application of insulation systems used on metal decks shall meet the requirements of Underwriters laboratories for Class A or Factory Mutual Research Corporation for Class I Insulated Steel Roof Deck.

2. Mechanically Fastened Insulation: Install each layer of insulation and secure through top of metal deck webs using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
  - a. Fasten insulation according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
  - b. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.
3. Locate the long dimension edge joints to have solid bearing on top of deck ribs; do not cantilever over deck rib openings or flutes.

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