

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

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
- B. Roof and deck insulation, and vapor retarder, on new metal deck substrates ready to receive roofing membrane.
- C. Repairs and alteration work to existing roof insulation as required for mechanical work.

**1.2 RELATED WORK**

- A. Section 06 10 00, ROUGH CARPENTRY: Wood Blocking and Edge Strips.

**1.3 APPLICABLE PUBLICATIONS**

- A. Comply with references to extent specified in this section.
- B. American Society of Civil Engineers
  - ASCE 7-16.....Minimum Design Loads and Associated Criteria for Buildings and Other Structures
- C. American Society of Heating, Refrigeration and Air Conditioning (ASHRAE):
  - Standard 90.1-13.....Energy Standard for Buildings Except Low-Rise Residential Buildings.
- D. ASTM International (ASTM):
  - C726-17.....Mineral Fiber Roof Insulation Board.
  - C728-17a.....Perlite Thermal Insulation Board.
  - C1289-19.....Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
  - D41/D41M-11 (2016).....Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
  - D312/D312M-16a.....Asphalt Used in Roofing.
  - D2178/D2178M-15a.....Asphalt Glass Felt Used in Roofing and Waterproofing.
  - D2822/D2822M-05(2011)e1.Asphalt Roof Cement, Asbestos Containing.
  - D4586/D4586M-07(2018)...Asphalt Roof Cement, Asbestos-Free.
  - E84-20.....Surface Burning Characteristics of Building Materials.
  - F1667-18a.....Driven Fasteners: Nails, Spikes, and Staples.
- E. National Roofing Contractors Association (NRCA):
  - Manual-15.....The NRCA Roofing Manual: Membrane Roof Systems-2019.

F. UL LLC (UL):

Listed Online Certifications Directory.

G. U.S. Department of Agriculture (USDA):

USDA BioPreferred Program Catalog.

H. U.S. Department of Commerce National Institute of Standards and Technology (NIST):

DOC PS 1-19.....Structural Plywood.

DOC PS 2-18.....Performance Standard for Wood-Based  
Structural-Use Panels.

**1.4 SUBMITTALS**

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings:

1. Show size, configuration, and installation details.

a. Nailers, cants, and terminations.

b. Layout of insulation showing slopes, tapers, penetrations, and edge conditions.

C. Manufacturer's Literature and Data:

1. Description of each product.

D. Samples:

1. Roof insulation, each type.

2. Fasteners, each type.

E. Qualifications: Substantiate qualifications meet specifications.

1. Installer.

**1.5 QUALITY ASSURANCE**

A. Installer Qualifications: Same installer as Division 07 roofing section installer.

**1.6 DELIVERY**

A. Comply with recommendations of NRCA Manual.

B. Deliver products in manufacturer's original sealed packaging.

C. Mark packaging, legibly. Indicate manufacturer's name or brand, type, and manufacture date.

D. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

**1.7 STORAGE AND HANDLING**

A. Comply with recommendations of NRCA Manual.

B. Store products indoors in dry, weathertight facility.

C. Protect products from damage during handling and construction operations.

#### **1.8 FIELD CONDITIONS**

A. Environment: Install products when existing and forecasted weather permit installation according to manufacturer's instructions.

#### **1.9 WARRANTY**

A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

B. Manufacturer's Warranty: Warrant vapor retarder and insulation against material and manufacturing defects as part of Division 07 roofing system warranty.

### **PART 2 - PRODUCTS**

#### **2.1 SYSTEM PERFORMANCE**

A. Insulation Thermal Performance:

1. Overall Average R-Value: RSI-57 (R-33), minimum.
2. Any Location R-Value: RSI-17 (R-10), minimum.

B. Wind Uplift Resistance: Provide roof insulation complying with requirements specified in Division 07 roofing section.

C. Insulation on Metal Decking: UL labeled indicating compliance with one of the following:

1. UL Listed.
2. Insulation Surface Burning Characteristics: When tested according to ASTM E84.
  - a. Flame Spread Rating: 75 maximum.
  - b. Smoke Developed Rating: 150 maximum.

#### **2.2 PRODUCTS - GENERAL**

A. Provide each product from one manufacturer to match existing.

#### **2.3 ADHESIVES**

A. Primer: ASTM D41/D41M.

B. Asphalt: ASTM D312, Type III or IV for vapor retarders and insulation.

C. Modified Asphaltic Insulation Adhesive: Insulation manufacturer's recommended modified asphaltic, asbestos-free, cold-applied adhesive formulated to adhere roof insulation to another insulation layer.

D. Bead-Applied Urethane Insulation Adhesive: Insulation manufacturer's recommended bead-applied, low-rise, one- or multicomponent urethane adhesive formulated to adhere roof insulation to another insulation layer.

E. Full-Spread Applied Urethane Insulation Adhesive: Insulation manufacturer's recommended spray-applied, low-rise, two-component urethane adhesive formulated to adhere roof insulation to substrate or to another insulation layer.

F. Roof Cement: Asbestos free, ASTM D2822/D2822M, Type I or Type II; or, ASTM D4586/D4586M, Type I or Type II.

#### **2.4 ROOF AND DECK INSULATION**

A. Roof and Deck Insulation, General: Preformed roof insulation boards approved by roofing manufacturer.

B. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, Grade 2, faced with glass fiber reinforced cellulosic felt facers on both major surfaces of the core foam.

C. Tapered Roof Insulation System:

1. Fabricate of polyisocyanurate. Use only one insulation material for tapered sections. Use only factory-tapered insulation.
2. Cut to provide high and low points with crickets and slopes as shown.
3. Minimum thickness of tapered sections; 38 mm (1-1/2 inch).
4. Minimum slope 1/48 (1/4 inch per 12 inches).

#### **2.5 INSULATION ACCESSORIES**

A. Glass (Felt): ASTM D2178/D2178M, Type VI, heavy duty ply sheet.

B. Vapor Retarder:

1. Glass-Fiber Felts: ASTM D2178/D2178M, Type IV, asphalt impregnated.
2. Self-Adhering Sheet Vapor Retarder: ASTM D1970/D1970M, minimum 1.0 mm (40 mils) thick membrane of HDPE film fully coated with asphalt adhesive, or 0.76 to 1.0 mm (30 to 40 mils) thick membrane of butyl rubber based adhesive backed by a layer of high density cross-laminated polyethylene; maximum permeance rating of 6 ng/Pa/s/sq. m (0.1 perms).

#### **2.6 ACCESSORIES**

A. Fasteners: Corrosion-resistant carbon steel fasteners and galvalume-coated steel or plastic round plates for fastening substrate board and insulation to roof deck.

B. Nails: ASTM F1667; type to suit application.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

A. Comply with requirements of Division 07 roofing section.

**3.2 PREPARATION**

- A. Examine and verify substrate suitability for product installation.
- B. Protect existing construction and completed work from damage.

**3.3 INSTALLATION - GENERAL**

- A. Install products according to manufacturer's instructions.
  - 1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.
- B. Comply with requirements of UL for insulated steel roof deck.
- C. Attach substrate board and other products to meet requirements of Division 07 roofing section.

**3.4 VAPOR RETARDER INSTALLATION**

- A. Vapor Retarder Installation, General:
  - 1. Install continuous vapor retarder on roof decks where indicated.
  - 2. At vertical surfaces, turn up vapor retarder to top of insulation or base flashing.
  - 3. Seal penetrations through vapor retarder with roof cement to prevent moisture entry from below.

**3.5 INSULATION INSTALLATION**

- A. Insulation Installation, General:
  - 1. Base Sheet: Where required by roofing system, install one lapped base sheet specified in Division 07 roofing section by mechanically fastening to roofing substrate before installation of insulation.
  - 2. Use same insulation as existing for roof repair and alterations unless specified otherwise.
- B. Insulation Thickness:
  - 1. Thickness of roof insulation shown on drawings is nominal. Provide thickness required to comply with specified thermal performance.
  - 2. Insulation on Metal Decks: Provide insulation in minimum thickness recommended by insulation manufacturer to span deck flutes. Support edges of insulation on metal deck ribs.
  - 3. When actual insulation thickness differs from drawings, coordinate alignment and location of roof drains, flashing, gravel stops, fascias and similar items.
  - 4. Where tapered insulation is used, maintain insulation thickness at high points and roof edges shown on drawings.
    - a. Low Point Thickness: Minimum 38 mm (1-1/2 inches).

5. Use minimum two layers of insulation when required thickness is 68 mm (2.7 inch) or greater.
- C. Lay insulating units with close joints, in regular courses and with end joints staggered.
1. Stagger joints between layers minimum 150 mm (6 inches).
- D. Lay units with long dimension perpendicular to the rolled (longitudinal) direction of the roofing felt.
- E. Seal cut edges at penetrations and at edges against blocking with bitumen or roof cement.
- F. Cut to fit tightly against blocking or penetrations.
- G. Cover all insulation installed on the same day; comply with temporary protection requirements of Division 07 roofing section.
- H. Installation Method:
1. Mechanically Fastened and Adhered Insulation:
    - a. Fasten first layer of insulation according to "Mechanically Fastened Insulation" requirements.
    - b. Fasten each subsequent layer of insulation according to "Adhered Insulation" requirements.
  2. Mechanically Fastened Insulation (first layer):
    - a. Fasten insulation according to requirements in Division 07 roofing section.
    - b. Fasten insulation to resist uplift pressures specified in Division 07 roofing section and ASCE-7.
  3. Adhered Insulation (subsequent layers):
    - a. Prime substrate as required.
    - b. Set each layer of insulation firmly in solid mopping of hot asphalt.
    - c. Set each layer of insulation firmly in ribbons of bead-applied insulation adhesive.
    - d. Set each layer of insulation firmly in uniform application of full-spread insulation adhesive.

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