

## SECTION 07 22 00

## ROOF AND DECK INSULATION

01/07

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

## ASTM INTERNATIONAL (ASTM)

ASTM C 1177/C 1177M (2006) Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing

ASTM C 1289 (2007) Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board

ASTM E 84 (2007b) Standard Test Method for Surface Burning Characteristics of Building Materials

## FM GLOBAL (FM)

FM AS 4470 (1986; R 1992) Class I Roof Covers

FM P7825 (2005) Approval Guide

FM P7825c (2005) Approval Guide Building Materials

FM P9513 (2002) Specialist Data Book Set for Roofing Contractors; contains 1-22 (2001), 1-28 (2002), 1-29 (2002), 1-28R/1-29R (1998), 1-30 (2000), 1-31 (2000), 1-32 (2000), 1-33 (2000), 1-34 (2001), 1-49 (2000), 1-52 (2000), 1-54 (2001)

## 1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

## SD-02 Shop Drawings

Wood nailers

Tapered roof insulation system; G, AE

Show a complete description of the procedures for the installation of each phase of the system indicating the type of materials, thicknesses, identity codes, sequence of laying insulation,

location of ridges and valleys, special methods for cutting and fitting of insulation, and special precautions. The drawings shall be based on field measurements.

#### SD-03 Product Data

Fasteners; G, AE

Insulation; G, AE

Include minimum thickness of insulation for steel decks and fastener pattern for insulation on steel decks.

Protection Board; G, AE

#### SD-07 Certificates

Installer qualifications; G, AE

#### SD-08 Manufacturer's Instructions

Nails and fasteners

Roof insulation; G, including field of roof and perimeter attachment requirements.

### 1.3 MANUFACTURER'S CERTIFICATE

Submit certificate from the insulation manufacturer attesting that the installer has the proper qualifications for installing tapered roof insulation systems.

### 1.4 DELIVERY, STORAGE, AND HANDLING

#### 1.4.1 Delivery

Deliver materials to site in manufacturer's unopened and undamaged standard commercial containers bearing the following legible information:

- a. Name of manufacturer;
- b. Brand designation;
- c. Specification number, type, and class, as applicable, where materials are covered by a referenced specification; and

Deliver materials in sufficient quantity to allow continuity of the work.

#### 1.4.2 Storage and Handling

Store and handle materials in a manner to protect from damage, exposure to open flame or other ignition sources, and from wetting, condensation or moisture absorption. Store in an enclosed building or trailer that provides a dry, adequately ventilated environment. Replace damaged material with new material.

### 1.5 ENVIRONMENTAL CONDITIONS

Do not install roof insulation during inclement weather or when air

temperature is below 40 degrees F and interior humidity is 45 percent or greater, or when there is visible ice, frost, or moisture on the roof deck.

#### 1.5.1 Special Protection

Provide special protection approved by the insulation manufacturer, or avoid heavy traffic on completed work when ambient temperature is above 80 degrees F.

### PART 2 PRODUCTS

#### 2.1 INSULATION

##### 2.1.1 Insulation Type

Roof insulation shall be compatible with attachment methods for the specified roof membrane:

- a. Polyisocyanurate Board: ASTM C 1289 Type II, fibrous felt or glass mat membrane both sides, except minimum compressive strength shall be 20 pounds per square inch (psi).

##### 2.1.2 Insulation Thickness

As necessary to provide a thermal resistance (R value) of 30 or more for average thickness of tapered system. Thickness shall be based on the "R" value for aged insulation. Insulation over steel decks shall satisfy both specified R value and minimum thickness for width of rib opening recommended in insulation manufacturer's published literature.

##### 2.1.3 Tapered Roof Insulation

One layer of the tapered roof insulation assembly shall be factory tapered to a slope of not less than 1/4 inch per foot. Provide starter and filler blocks as required to provide the total thickness of insulation necessary to meet the specified slope and thermal conductance. Mitered joints shall be factory fabricated and shall consist of two diagonally cut boards or one board shaped to provide the required slopes. Identify each piece of tapered insulation board by color or other identity coding system, allowing the identification of different sizes of tapered insulation board required to complete the roof insulation system.

#### 2.2 FASTENERS

##### 2.2.1 Fasteners for Steel Decks

Approved hardened penetrating fasteners or screws conforming to FM AS 4470 and listed in FM P7825c for Class I roof deck construction. Quantity and placement to withstand a minimum uplift pressure of 30 psf conforming to FM P7825.

#### 2.3 PROTECTION BOARD

For use over polyisocyanurate insulation at adhesively-applied roofing membrane and as a underlayment to span flutes of metal deck where shown on drawings.

### 2.3.1 Glass Mat Gypsum Roof Board

ASTM C 1177/C 1177M, 0 Flame Spread and 0 Smoke Developed when tested in accordance with ASTM E 84, 500 psi, Class A, non-combustible, 1/2 inch thick, 4 by 8 feet board size.

### 2.4 WOOD NAILERS

Pressure-preservative-treated as specified in Section 06 10 00 ROUGH CARPENTRY.

## PART 3 EXECUTION

### 3.1 EXAMINATION AND PREPARATION

#### 3.1.1 Surface Inspection

Surfaces shall be clean, smooth, and dry. Surfaces receiving vapor retarder shall be free of projections which might puncture the vapor retarder. Check roof deck surfaces, including surfaces sloped to roof drains and outlets, for defects before starting work.

The Contractor shall inspect and approve the surfaces immediately before starting installation. Prior to installing vapor retarder and insulation, perform the following:

Examine steel decks to ensure that panels are properly secured to structural members and to each other and that surfaces of top flanges are flat or slightly convex.

#### 3.1.2 Surface Preparation

Correct defects and inaccuracies in roof deck surface to eliminate poor drainage and hollow or low spots and perform the following:

- a. Install wood nailers the same thickness as insulation at edges, curbs, walls, and roof openings for securing flashing flanges.
- b. Cover steel decks with a layer of insulation board of sufficient thickness to span the width of a deck rib opening, and conforming to fire safety requirements. Secure with piercing or self-drilling, self-tapping fasteners of quantity and placement conforming to FM P7825. Insulation joints parallel to ribs of deck shall occur on solid bearing surfaces only, not over open ribs.

### 3.2 INSULATION INSTALLATION

Apply insulation in two layers with staggered joints when total required thickness of insulation exceeds 1/2 inch. Lay insulation so that continuous longitudinal joints are perpendicular to direction of roofing, as specified in Section 07 53 23, ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING, and end joints of each course are staggered with those of adjoining courses. When using multiple layers of insulation, joints of each succeeding layer shall be parallel and offset in both directions with respect to layer below. Keep insulation 1/2 inch clear of vertical surfaces penetrating and projecting from roof surface.

### 3.2.1 Installation Using Only Mechanical Fasteners

Secure total thickness of insulation with penetrating type fasteners.

### 3.2.2 Special Precautions for Installation of Foam Insulation

#### 3.2.2.1 Polyisocyanurate Insulation

Where polyisocyanurate foam board insulation is provided, install 1/2 inch thick glass mat gypsum roof board over top surface of foam board insulation. Stagger joints of insulation with respect to foam board insulation below.

### 3.3 PROTECTION

#### 3.3.1 Protection of Applied Insulation

Completely cover each day's installation of insulation with the finished roofing specified in Section 07 53 23, ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING, on same day. Do not permit phased construction. Protect open spaces between insulation and parapets or other walls and spaces at curbs, scuttles, and expansion joints, until permanent roofing and flashing are applied. Do not permit storing, walking, wheeling, or trucking directly on insulation or on roofed surfaces. Exposed edges of the insulation shall be protected by cutoffs at the end of each work day or whenever precipitation is imminent. Cutoffs shall be EPDM membrane set in roof cement. Fill all profile voids in cut-offs to prevent entrapping of moisture into the area below the membrane. Cutoffs shall be removed when work is resumed.

#### 3.3.2 Damaged Work and Materials

Restore work and materials that become damaged during construction to original condition or replace with new materials.

### 3.4 INSPECTION

The Contractor shall establish and maintain an inspection procedure to assure compliance of the installed roof insulation with the contract requirements. Any work found not to be in compliance with the contract shall be promptly removed and replaced or corrected in an approved manner. Quality control shall include, but not be limited to, the following:

- a. Observation of environmental conditions; number and skill level of insulation workers; start and end time of work.
- b. Verification of certification, listing or label compliance with FM P9513.
- c. Verification of proper storage and handling of insulation and vapor retarder materials before, during, and after installation.
- d. Inspection of mechanical fasteners; type, number, length, and spacing.
- f. Coordination with other materials.
- g. Inspection of insulation joint orientation and laps between layers, joint width and bearing of edges of insulation on deck.

- h. Installation of cutoffs and proper joining of work on subsequent days.
- i. Continuation of complete roofing system installation to cover insulation installed same day.

-- End of Section --