JOINT BASE LEWIS McCHORD DESIGN STANDARDS

DIVISION 07 THERMAL AND MOISTURE PROTECTION

SECTION 07 22 00

ROOF AND DECK INSULATION

# 08/18

PART 1 GENERAL

* 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 C578 (2011be1) Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation

ASTM E84 (2012) Standard Test Method for Surface Burning Characteristics of Building Materials

FM GLOBAL (FM)

FM APP GUIDE (updated on-line) Approval Guide <http://www.approvalguide.com/>

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) |

UNDERWRITERS LABORATORIES (UL)

UL Bld Mat Dir (2012) Building Materials Directory

* 1. SUBMITTALS

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NOTE: If 01 33 29 is incorporated in the specifications, select that option below. If not, select the option for 01 57 19. Include items noted at SD-01 and SD-11 as applicable, based on project scope.

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Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control information only. Submittals with an "S" are for inclusion in the [Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING]‌[Environmental Records Binder, in conformance to Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS]. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Insulation (Recycled Content); S

Interior Materials (VOC Content); S

SD-02 Shop Drawings

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 Insulation; G

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

SD-06 Test Reports

Flame spread and smoke developed ratings Submit in accordance with ASTM E84.

SD-07 Certificates

Installer qualifications

SD-08 Manufacturer's Instructions Nails and fasteners

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

SD-11 Closeout Submittals

Insulation (Recycled Content); S

Interior Materials (VOC Content); S

* 1. MANUFACTURER'S CERTIFICATE

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

Certificates of compliance for felt materials.

* 1. QUALITY ASSURANCE
		1. Insulation on Combustible or Steel Decks

Roof insulation 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 E84. Insulation bearing the UL label and listed in the UL Bld Mat Dir 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 and the construction is listed as fire-classified in the UL Bldg Mat Dir or listed as Class I roof deck construction in the FM APP GUIDE. Insulation tested as part of a roof construction assembly shall bear UL or FM labels attesting to the ratings specified herein. Polystyrene insulation shall be tested and listed for use without a thermal barrier such as glass mat gypsum roof board or perlite insulation in the tested assembly.

* 1. DELIVERY, STORAGE, AND HANDLING
		1. Delivery

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

* + - 1. Name of manufacturer;
			2. Brand designation;
			3. 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. 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.

1.6 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.

PART 2 PRODUCTS

2.1 PRODUCT SUSTAINABILITY CRITERIA

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NOTE: If 01 33 29 is incorporated in the specifications, select that option below. If not, select the option for 01 57 19.

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2.1.1 Reduced Volatile Organic Compound (VOC) Content

Provide interior products with reduced VOC content and provide documentation in accordance with Section [01 33 29 SUSTAINABILITY REPORTING][01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS] paragraph REDUCE VOLATILE ORGANIC COMPOUNDS (VOC) (LOW EMITTING MATERIALS).

2.1.2 Recycled Content

Provide products with recycled content and provide documentation in accordance with Section [01 33 29 SUSTAINABILITY REPORTING][01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS] paragraph RECYCLED CONTENT. For more information see [https://sftool.gov/greenprocurement/green-products/1/‌construction-materials/22/building-insulation/0?addon=False](https://sftool.gov/greenprocurement/green-products/1/construction-materials/22/building-insulation/0?addon=False) and https://www.epa.gov/smm/comprehensive-procurement-guideline-cpg-program.

* 1. INSULATION
		1. Insulation Types

Provide one, or an assembly of a maximum of three, of the following roof insulation materials. Provide roof insulation that is compatible with attachment methods for the specified insulation and roof membrane.

* + - 1. Polystyrene Board: Shall be in accordance with ASTM C578, Type IV, or X.
		1. Insulation Thickness

As necessary to provide a thermal resistance (R value) as indicated. Thickness shall be based on the "R" value for aged insulation, which shall be a minimum of R-5 per inch thickness. 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.

* 1. MOISTURE CONTROL
		1. Vapor Retarder

Minimum 10 mil polyethylene sheet or self-adhering membrane composed of SBS modifed bitumen and high density laminated, reinforced polyethylene, approved by roofing system manufacturer.

2.3 FASTENERS

Flush-driven through flat round or hexagonal steel or plastic plates. Steel plates shall be zinc-coated, flat round not less than 1 3/8 inch diameter or hexagonal not less than 28 gage. Plastic plates shall be high-density, molded thermoplastic with smooth top surface, reinforcing ribs and not less than 3 inches in diameter. Fastener head shall recess fully into the plastic plate after it is driven. Plates shall be formed to prevent dishing.

Do not use bell-or cup-shaped plates. Fasteners shall conform to insulation manufacturer's recommendations except that holding power, when driven, shall be not less than 40 pounds each in steel deck. Fasteners for steel decks shall conform to FM APP GUIDE for Class I roof deck construction, and shall be spaced to withstand an uplift pressure of 60 pounds per square foot.

2.3.1 Roofing Nails for Wood Decks

Barbed 11 gage, zinc-coated nails with 7/16 to 5/8 inch diameter heads or annular ring shank, square head, one-piece composite nails. Nails shall be long enough to penetrate wood deck at least 5/8 inch but shall not protrude through underside of decking.

PART 3 EXECUTION

* 1. EXAMINATION AND PREPARATION
		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.

Surfaces shall be inspected and approved before starting installation. Prior to installing vapor retarder, perform the following:

* + - 1. Examine wood decks to ascertain that deck boards have been properly nailed and that exposed nail heads have been set.
			2. 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.
		1. Surface Preparation

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

b. Fill or cover cracks or knot holes larger than 1/2 inch in diameter in wood decks as necessary to form an unyielding surface.

* 1. INSTALLATION OF VAPOR RETARDER

Install vapor retarder in accordance with manufacturer's instructions.

* 1. INSULATION INSTALLATION

Apply insulation in two layers with staggered joints when total required thickness or insulation exceeds 1/2 inch. Lay insulation so that continuous longitudinal joints are perpendicular to direction of 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.

3.3.1 Installation Using Only Mechanical Fasteners

Secure total thickness of insulation with penetrating type fasteners.

* 1. PROTECTION
		1. Protection of Applied Insulation

Completely cover each day's installation of insulation with the finished roofing or approved underlayment 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.

Provide smooth, clean board or plank walkways, runways, and platforms near supports, as necessary, to distribute weight.

* + 1. Damaged Work and Materials

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

* 1. 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:

* + 1. Observation of environmental conditions; number and skill level of insulation workers; start and end time of work.
		2. Verification of certification, listing or label compliance with FM P9513.
		3. Verification of proper storage and handling of insulation and vapor retarder materials before, during, and after installation.
		4. Inspection of vapor retarder application, including edge envelopes and mechanical fastening.
		5. Inspection of mechanical fasteners; type, number, length, and spacing.
		6. Coordination with other materials, cants, sleepers, and nailing strips.
		7. Inspection of insulation joint orientation and laps between layers, joint width and bearing of edges of insulation on deck.
		8. Installation of cutoffs and proper joining of work on subsequent days.
		9. Continuation of complete roofing system installation to cover insulation installed same day.

-- End of Section --