

SECTION 07220 - ROOF INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Special Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Roof insulation and overlay boards.
- B. Related Sections include the following:
 - 1. Section 06100; Rough Carpentry: contains requirements for wood blocking to be installed prior to roof insulation.
 - 2. Section 07552; SBS Modified Bituminous Membrane Roofing: contains requirements for roof membrane system to be installed over roof insulation.
 - 3. Section 01400; Quality Control: contains requirements for post construction testing to detect subsurface moisture within newly installed roof insulation.

1.3 GENERAL REQUIREMENTS

- A. General: Roof insulation, including overlay boards, fasteners and fastener plates, are to be considered components of a "total roof system", fully guaranteed by the manufacturer of the roof membrane system, even when manufactured by others.
- B. Factory Mutual Approval: It is a requirement of this project that all roof insulation, including overlay boards, fasteners and fastener plates, be approved by Factory Mutual Research Corporation as components of a complete tested roof assembly, listed in the latest edition of the Factory Mutual Research Approval Guide.
 - 1. All products shall be specifically listed by product name within the appropriate "Construction" number, for the appropriate "Roof Cover" and for the appropriate roofing material manufacturer specified in Section 07552, or otherwise approved.

2. All products shall be approved for the wind uplift categories specified on Drawing RP-1 for field, perimeter and corner areas.

1.4 SUBMITTALS

A. Product Data: For the following products:

1. Base insulation.
2. Overlay board.
3. Fasteners and fastening plates.
4. Asphalt primer.

B. Samples for Verification: For the following products:

1. Manufacturer's standard size wrapped and labeled base insulation.
2. Manufacturer's standard size wrapped and labeled overlay board.
3. Insulation fasteners of each type, length, and finish.

C. Material Safety Data Sheet for the following products:

1. Base insulation.
2. Overlay board.
3. Asphalt primer.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain insulation components manufactured, labeled or approved by roofing material manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver insulation materials to Project site in original manufacturer's wrapping with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.

- B. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation, including but not limited to the following:

1. Place insulation on pallets or platforms that are raised off the ground or roof deck at least four inches.
2. Fully cover all insulation bundles, including top and full height of sides, with "**breathable**" **waterproof** canvas

taraulins, tied daily to prevent blow-off or exposure of insulation to sunlight or precipitation. **Manufacturer's polyethylene wrapping and polyethylene or other non-breathable plastic tarps or coverings are not acceptable.** Any materials that are improperly covered overnight or during inclement weather will be marked by the Owner's representative and must be removed from the jobsite by the Contractor and replaced with new material at no additional cost to the Owner.

1.7 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit insulation to be installed according to manufacturer's written instructions and warranty requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: All products provided under this Section shall be manufactured, supplied or approved in writing as acceptable to one of the roofing material manufacturers specified in Section 07552. All materials provided under this Section are to be included in the roofing material manufacturer's "total roof system" warranty/guarantee.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II facer on both major surfaces, 23 psi. minimum compressive strength. Boards shall be 2" thick, 4'-0" by 4'-0".
1. Dimensional stability shall be 2% maximum linear change when conditioned at 158 degrees F and 97% relative humidity for seven days.
 2. Curing time shall be 24 hours per each inch of thickness, at a minimum of 60 degrees F before shipment from the manufacturer.
 3. Acceptable Manufacturer(s)/Product(s): Subject to compliance with specified requirements, manufacturer(s)/product(s) must be as approved and listed by Factory Mutual Research for use with the roofing material manufacturer(s)/product(s) specified in Section 07552, and include the following:
 - a. Acceptable base insulation for use with **Siplast** roof membrane system:
 - 1) Hunter Panels "H-Shield"

- 2) Atlas "ACFoam-II"
- b. Acceptable base insulation for use with **Soprema** roof membrane system:
 - 1) Johns-Manville "E'NRG'Y 2 (PSI-25)"
 - 2) Atlas "ACFoam-II"

2.2 OVERLAY BOARD

- A. Gypsum Roof Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate. Boards shall be 4'-0" by 8'-0". Thickness shall be as specified below per Factory Mutual approval for specific roofing material manufacturer.
1. Acceptable Manufacturer(s)/Product(s): Subject to compliance with specified requirements, manufacturer(s)/product(s) must be as approved and listed by Factory Mutual Research for use with the roofing material manufacturer(s)/product(s) specified in Section 07552, and include the following:
 - a. Acceptable overlay board for use with **Siplast** roof membrane system:
 - 1) G-P Gypsum Corp. "Dens-Deck Roof Board", $\frac{1}{4}$ " thick.
 - b. Acceptable overlay board for use with **Soprema** roof membrane system:
 - 1) G-P Gypsum Corp. "Dens-Deck Roof Board", $\frac{5}{8}$ " thick.

2.3 INSULATION FASTENERS

- A. Fasteners: Factory-coated steel fasteners and metal plates meeting corrosion-resistance provisions in FM 4470, designed for fastening roof insulation to metal roof deck substrate.
1. Acceptable Manufacturer(s)/Product(s): Subject to compliance with specified requirements, manufacturer(s)/product(s) must be as approved and listed by Factory Mutual Research for use with the roofing material manufacturer(s)/product(s) specified in Section 07552, and include the following:
 - a. Acceptable fasteners/plates for use with **Siplast** roof membrane system:
 - 1) Construction Fasteners, Inc. "#12 Dekfast" with "Hex Plate".
 - 2) Construction Fasteners, Inc. "#14 Dekfast" with "Hex Plate".
 - 3) ITW Buildex Corp. "#12 Roofgrip" with "Flat Bottom Metal Plate".

- 4) ITW Buildex Corp. "#14 Roofgrip" with "Flat Bottom Metal Plate".
 - 5) Olympic "Standard (#12)" with "Olympic Standard" plate.
 - 6) Olympic "Heavy Duty (#14)" with "Olympic Standard" plate.
 - 7) SFS Stadler "#12 Insul-Fixx" with "Insul-Fixx S" plate.
 - 8) SFS Stadler "#14 Insul-Fixx" with "Insul-Fixx S" plate.
- b. Acceptable fasteners/plates for use with **Soprema** roof membrane system:
- 1) Construction Fasteners, Inc. "#14 Dekfast" with "Hex Plate".
 - 2) SFS Stadler "#12 Insul-Fixx" with "Insul-Fixx S" plate.
 - 3) SFS Stadler "#14 Insul-Fixx" with "Insul-Fixx S" plate.

2.4 MISCELLANEOUS PRODUCTS

- A. Asphalt primer: ASTM D 41, approved by manufacturer of roofing material for use with torch-applied modified bitumen membrane system.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of insulation system:
1. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at perimeters, penetrations and terminations and that nailers match thicknesses of insulation, including overlay board.
 2. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane relative to adjoining deck.
 3. Proceed with installation only after unsatisfactory conditions have been corrected.
 4. Verify that all asphalt has been removed from top surface of metal deck and that all dirt and debris has been removed from deck flutes.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to insulation installation according to insulation manufacturer's written instructions. Remove sharp projections.

3.3 BASE INSULATION INSTALLATION

- A. Comply with insulation manufacturer's written instructions for installing roof insulation.
- B. Loose lay insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, tightly abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
 - 1. Cut and fit insulation within 1/4 inch of nailers, curbs, projections, and penetrations.

3.4 OVERLAY BOARD INSTALLATION

- A. Install overlay boards over base insulation with long joints in continuous straight lines with end joints staggered between rows. Stagger joints from joints in insulation below a minimum of 6 inches in each direction. Butt cover boards together and fasten to roof deck.
 - 1. Cut and fit insulation within 1/4 inch of nailers, curbs, projections, and penetrations.
 - 2. Fasten overlay boards through base insulation into metal roof deck, in accordance with FM requirements for specific tested assembly, as listed in the FM Approval Guide:
 - a. Fastening requirements for **Siplast** roof system:
 - 1) Field of roof shall be installed using nineteen (19) fasteners per 4' x 8' board (one fastener per each 1.7 sq.ft.)
 - 2) Perimeter of roof shall be installed using nineteen (19) fasteners per 4' x 8' board (one fastener per 1.7 sq.ft.)
 - 3) Corners of roof shall be installed using twenty-eight (28) fasteners per board (one fastener per 2.0 sq.ft. plus 75% increase).
 - b. Fastening requirements for **Soprema** roof system:
 - 1) Field of roof shall be installed using nineteen (16) fasteners per 4' x 8' board (one fastener per each 2.0 sq.ft.)
 - 2) Perimeter of roof shall be installed using nineteen (19) fasteners per 4' x 8' board (one fastener per 2.0 sq.ft.)
 - 3) Corners of roof shall be installed using twenty-eight (28) fasteners per board (one fastener per 2.0 sq.ft. plus 75% increase).

3. When fastening boards that fall within two different fastening areas (i.e. part corner/part perimeter, part perimeter/part field) the entire board shall be fastened using the pattern for the more restrictive area.
- B. Prime entire top surface of overlay board with asphalt primer at a rate of 3/4 gal./100 sq. ft. and **allow primer to dry thoroughly** before exposing to open flame.

END OF SECTION 07220

SAMPLE