SECTION 07 22 16

ROOF BOARD INSULATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section describes the requirements for furnishing and installing roof board insulation at Parking Structure elevator override and stair enclosures and as required to complete the Program.

B. Related Sections:

1. Thermal insulation is specified in Section 07 21 00.

2. Polyvinyl-chloride roofing is specified in Section 07 54 19.

3. Firestopping insulation is specified in Section 07 84 00.

4. Acoustical insulation is specified in Section 09 81 00.

1.02 SUBMITTALS

A. Shop Drawings: Show layout and identification of tapered roof insulation pieces. Coordinate with architectural roof plans and roof details.

B. Certification from roofing system manufacturer that insulation proposed for use is acceptable for application of roofing.

C. LEED Submittals:

1. MR Credit 4: Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.

a. Furnish the LEED Online Credit Template declaring that the credit requirements have been met and list the recycled content products used.

b. List total cost of all materials for the Project.

c. Required Audit Documentation:

1) Manufacturer product data sheets, literature or letters highlighting the overall post-consumer and/or post-industrial recycled content percentages (by weight) of each product listed on the template.

2) Materials invoices showing costs for each product listed on the template.

2. MR Credit 5: Product data for regional materials indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material.

a. Furnish the LEED Online Credit Template declaring that the credit requirements have been met.

b. Statement indicating cost and distance from manufacturer to Project for each regionally manufactured material.

c. Statement indicating cost and distance from point of extraction, harvest, or recovery to Project for each raw material used in regionally manufactured materials.

d. Calculations demonstrating that the Project incorporates the required percentage of regional materials/products and showing their cost, and the total cost of all materials for the Project.

e. Required Audit Documentation:

1) Manufacturer or vendor literature, product data sheets, letter stating address location of each material's final assembly site.

2) Map indicating distances from each location to the Project site.

3) Documentation of the cost/value of each material.

1.03 QUALITY ASSURANCE

A. Design Criteria: Insulation and roof assembly shall provide a minimum thermal rating of LTTR R-30 over conditioned spaces. At roof areas with tapered insulation, provide average LTTR R-values.

B. Labels and Approvals: Roof insulation shall be listed by UL for use with UL Class A roof covering systems, and bear the UL label or be delivered with a UL certification of compliance.

C. Roof insulation shall comply with EPA Energy Star – Program Requirements for Roof Products.

1.04 ENVIRONMENTAL QUALITY ASSURANCE

A. MR Credit 4: Provide building materials with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of [10-percent) [20-percent] of cost of materials used for the Project.

1. The cost of post-consumer content of an item shall be determined by dividing the weight of post-consumer recycled content in the item by the total weight of the item and multiplying by the cost of the item.

2. The cost of post consumer recycled content plus one-half of pre-consumer recycled content of an item shall be determined by dividing the weight of post-consumer recycled content plus one-half of pre-consumer recycled content in the item by the total weight of the item and multiplying by the cost of the item.

B. MR Credit 5: Provide 10-percent of building materials (by cost) that are regional materials (extracted, harvested or recovered, and manufactured within 500 miles of the Project site). Distances can be computed at http://www.indo.com/cgi-bin/dist?place1=&place2=.

1. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value.

2. Determine percentage of post-consumer and post-industrial content separately, using the guidelines contained in 16 CFR 260.7(e).

3. Previously used, reused, refurbished, and salvaged products are not considered recycled.

4. Determine percentage of recycled content of any item by dividing the weight of recycled content in the item by the total weight of all material in the item.

5. Determine value of recycled content of each item separately, by multiplying the content percentage by the value of the item.

C. Applicable LEED Credits:

1. Credit MR 4 – Recycled Content.

2. Credit MR 5 – Regional Materials.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. 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.

PART 2 - PRODUCTS

2.01 ROOF INSULATION AT SINGLE PLY ROOFING

A. Polyisocyanurate Board Roof Insulation: HCFC-free rigid closed-cell, non-composite, polyisocyanurate board insulation integrally laminated to heavy non-asphaltic fiber-reinforced felt facers conforming to ASTM C1289, Type II, Class 1.

1. Approved Manufacturers: Johns Manville "ENRGY 3" or approved equal.

2. Thickness: As required to result in specified LTTR-value.

3. Compressive Strength: Minimum 25-psi.

4. Blowing Agent: HCFC free hydrocarbon.

5. Fire-Ratings: ASTM E108 Class A; ASTM E119 non-combustible.

6. Provide tapered units where required for slope to drain. Minimum thickness at tapered boards shall be 1/2-inch. Minimum slope to drains shall be 1/4-inch per foot.

7. Provide in multiple layers. Minimum thickness of first layer shall be 1-inch or as recommended by roof insulation manufacturer for spanning metal deck flutes. Maximum thickness of any layer shall not exceed 1-1/2-inches.

B. Cover Board: Provide one of the following, at Developer Design/Builder's option.

1. High-Density Polyisocyanurate: Johns Manville "Invinsa Roof Board" or approved equal, high-density polyisocyanurate bonded in-line to mineral-surfaced, fiber glass reinforced facers.

2. Substrate Board: ASTM C1177, glass-mat, water-resistant gypsum substrate, minimum 1/2-inch thick.

3. Perlite Board: ASTM C728, composed of expanded perlite, cellulosic fibers, binders and waterproofing agents with top surface seal-coated, 3/4-inch thick.

C. Substrate Board: Provide substrate board over metal deck if required for fire ratings.

1. Substrate Board: ASTM C1177, glass-mat, water-resistant gypsum substrate, minimum 1/2-inch thick.

2. Substrate Board: ASTM C728, perlite board, 3/4-inch thick, seal coated.

3. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening substrate panel to roof deck.

2.02 INSULATION FASTENERS

A. Mechanical Fasteners: As recommended by roof insulation manufacturer for securing roof insulation to metal decking and as required for Factory Mutual wind uplift resistance rating of I-90.

B. Asphalt Adhesive: Steep asphalt, as recommended by roof insulation manufacturer.

PART 3 - EXECUTION

3.01 SUBSTRATE BOARD INSTALLATION

A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

1. Fasten substrate board to top flanges of steel deck according to recommendations in FMG's "Approval Guide" for specified Windstorm Resistance Classification.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 ROOF BOARD INSTALLATION

A. Coordinate installation of roof system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Install roof insulation in conformance with manufacturer's printed instructions.

C. Install and secure preformed cant strips at junctures of roofing with vertical surfaces or angle changes greater than 45-degrees.

D. Install tapered insulation where required to conform to roof slopes.

E. Install insulation with long joints in a continuous straight line with end joints staggered between rows, 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, projections, and penetrations.

F. Install one or more layers of insulation to achieve required thickness. Where overall insulation thickness is 1-1/2-inches or greater, install 2 or more layers with joints of each layer staggered from joints of previous layer a minimum of 6-inches in each direction.

G. Trim surface of insulation where required at roof drains so completed surfaces is flush and does not restrict water flow.

H. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

I. Mechanically Fastened Insulation: Secure uppermost layer of insulation to deck using mechanical fasteners design and sized for fastening roof insulation to deck type. Loose lay all other layers below with staggered joints.

1. Fasten according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.

2. Install subsequent layers in a cold fluid-applied adhesive in accordance with manufacturer's instructions.

J. Adhered Insulation:

1. Set insulation in hot solid mopping of steep asphalt, applied at a rate of 25-lbs. per 100-sq. ft.

2. Run long joints of insulation in continuous straight line, with end joints staggered between rows. Butt joints tightly.

3. Install tapered pieces in accordance with approved layout drawings. Begin installation at roof drains or low points and work up toward ridges, parapets and roof edges.

3.04 COVER BOARD INSTALLATION

A. Coordinate installation of roof system components so cover board is not exposed to precipitation or left exposed at the end of the workday.

B. Install cover board in conformance with manufacturer's printed instructions.

C. Install cover board with long joints in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4-inch with cover board.

1. Cut and fit cover board within 1/4-inch of nailers, projections, and penetrations.

D. Trim surface of cover board where required at roof drains so completed surface is flush and does not restrict water flow. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

E. Adhered Cover Board: Adhere cover board to roof insulation. Set in a two-part cold fluid-applied adhesive in accordance with manufacturer's instructions.

3.04 CLEANUP

A. Remove debris resulting from work under this Section from roof surfaces and Project site,

B. Leave surfaces in a condition acceptable to roof membrane installer.

3.05 WASTE MANAGEMENT

A. Comply with Section 01 74 19.

B. Plan and coordinate the insulation work to minimize the generation of offcuts and waste. Reuse insulation scrtaps to the maximum extent feasible.

C. Separate and recycle waste materials to the maximum extent possible.

END OF SECTION