

DIVISION 7 THERMAL & MOISTURE PROTECTION

07 22 00 Cover Board Over Isocyanurate Roof Insulation

PART 1 GENERAL

1.01 Summary

- A. This standard provides general guidance concerning the specific preferences of Texas State University, the Round Rock Campus only for roof insulation on low slope roof areas only.
- B. Texas State University recognizes that project conditions and requirements vary, thus precluding the absolute adherence to the items identified herein in all cases. However, unless there is adequate written justification, it is expected that these guidelines will govern the design and specifications for Texas State University projects
- C. Extent of Insulation work is shown on Drawings and indicated by provisions of this Section.
- D. Applications of insulation specified in this Section include the following materials:
 - 1. Isocyanurate board type roof insulation
 - 2. Preformed perlite tapered cricket insulation
 - 3. Preformed tapered insulation systems
 - 4. Impact resistant cover board
- E. Extent of roof insulation work is shown on Drawings and indicated by provisions of this Section.

1.02 QUALITY ASSURANCE

- A. Insulation values calculated to conform to these Specifications shall be based on the 6-month conditioned thermal values as determined by the RIC/TIMA Thermal Conditioning Procedure. The guidelines shall comply with those published by RIC/TIMA Technical Bulletin No. 281-1 and as endorsed by the National Roofing Contractors Association (NRCA) and Federal Specification HH-I-1972.
- B. The materials shall comply with requirements for Underwriters Laboratory Class A Fire Rating, Factory Mutual Class I requirements, or local codes, whichever is the most stringent.

1.03 SUBMITTALS

- A. The Contractor shall provide submittals in advance of the prerooting conference. Any materials ordered prior to receiving written approval of submittals shall be at the Contractor's risk.
- B. The Contractor shall provide submittals in advance of delivery to the jobsite of all insulation materials. Any materials ordered prior to receiving written approval of submittals shall be at the Contractor's risk.

- C. Submittals shall be provided in accordance with the General Conditions of the Contract. Provide a submittal cover sheet identifying the project by name and number and listing the following columns for review by the design professional with a separate sheet for each roof section.
 - 1. Specification section
 - 2. Description of brand and product
 - 3. "Accepted"
 - 4. "Rejected"
 - 5. "Resubmit"
 - 6. "Comments"
- D. Provide a place for the design professional's signature.
- E. Tapered insulation layouts shall be prepared in advance and submitted as a part of the submittal package.
- F. Shop Drawings: Show roofing system with flashings and accessories in plan, sections, and details. Include metal thicknesses and finishes, panel lengths, joining details, anchorage details, flashings and special fabrication provisions for termination and penetrations; thermal expansion provisions and special supports. Indicate relationships with adjacent and interfacing work. Indicate fastener types and spacing, and provide fastener pullout values.
- G. Manufacturer's Letter of Certification: Provide a letter from the roofing material manufacturer using the exact language on the attached letter and listing all materials comprising any part of the roof assembly and stipulating that such materials are acceptable to the manufacturer and will be covered under the manufacturer's Twenty (20) Year No Dollar Limit Total Roof System Guarantee.

1.04 PRODUCT HANDLING

- A. All materials covered under this Section are to be stored and protected as specified elsewhere in these documents.
- B. Materials damaged or rendered unusable for any cause resulting from the Contractor's acts or omissions shall be removed from the jobsite at the Contractor's expense.
- C. Insulation and Cover Board shall not be stocked or stored on the roof overnight for any reason. All insulation is to be stored in a covered storage trailer. No material may be stocked on the ground or on the roof. Covering insulation with tarpaulins or plastic is not acceptable.
- D. An allotment of insulation and cover board for daily production shall be loaded to the roof and used the same day, or removed from the roof and stored as stipulated elsewhere.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Polyisocyanurate Insulation Board - Rigid, closed cell, isocyanurate insulation board having a "R" value as calculated in accordance with the 1987 MRCA/NRCA Joint Bulletin which specifies an "in-service" R-value = 5.6 per inch thickness excluding the facer sheet. The factory applied facer sheet shall be fully adhered to both sides of the insulation board and shall be asphalt compatible; fiberglass reinforced and shall meet ASTM C1289-06, Type II Class 21, Class 21, Grade 3 (25 psi). The following additional criteria shall apply:
1. Board density shall be 2.0 lbs. per cubic foot when measured in accordance with ASTM D-1622.
 2. Compressive strength shall be 20 psi minimum when measured in accordance with ASTM C-209 or ASTM D-1621.
 3. Board insulation shall comply with water absorption requirements when measured in accordance with ASTM C-272.
 4. Acceptable manufacturers shall be the following:
 - a. Atlas Insulation Company, 116 Danielson Pike Rd., North Scituate, RI 02857
 - b. Firestone Building Products Company, 310 East 96th Street, Indianapolis, IN 46240
 - c. Johns Manville Corporation, P.O. Box 5108, Denver, CO 80217-5108
 - d. Hunter Panel, 15 Franklin Street, Portland, ME 04101
 - e. GAF Building Materials Corporation, 1361 Alps Road, Wayne, New Jersey 07470
 - f. R-Max Corporation, 13524 Welch Road, Dallas, TX 75244
 5. Isocyanurate insulation board stock larger than 4'x 4' is not acceptable under any circumstances.
 6. No isocyanurate insulation board stock thicker than 2" shall be laid in a single layer. Where the "R" value or other details requires an iso thickness greater than 2", such thickness shall be achieved by multiple layers of isocyanurate insulation.
 7. Where a specific "R" value equivalent to 22.0 is required that value shall be achieved as follows:
 - a. Two layers of 2.0" isocyanurate insulation board not exceeding 48"x48"
 - b. One additional layer cover board as specified in sheets not to exceed 48" x 96".
 8. Tapered insulation boards shall be provided in sizes of 24" x 48" or 48" x 48" sections. Board shall be factory cut in tapers equivalent to those shown on the Drawings or stipulated in a layout prepared by the manufacturer and approved in advance. Minimum and maximum board thickness shall be as shown in the Drawings.

- B. Cover Board ~ Rigid, hard, impact and moisture resistant cover board shall be asphalt compatible and suitable for torch applications with an open flame torch.
 - 1. Acceptable products and manufacturers listed below are intended to be equivalent in performance:
 - a. 3/4" thick DuraBoard manufactured by Johns Manville Corporation, P.O. Box 5108, Denver, CO 80217-5108
 - b. 1/2" thick Securock, manufactured by U.S. Gypsum Company, 125 South Franklin Street, Chicago, IL 60680-4124.

2.02 Crickets and Drain sumps

- A. Tapered isocyanurate as specified above also shall be used for formation of crickets, saddles, kick-backs, and sumps around drains and where otherwise shown on details.

2.03 THERMAL VALUES

- A. Contractor shall select isocyanurate insulation suitable for a two-layer system. The combined "R" value shall be equal to or greater than 22.00 as calculated by the in-service method established by the MRCA/NRCA Joint Bulletin of 1987.

2.04 INSULATION ADHESIVE MATERIALS

- A. Foam Adhesives - The following foam adhesive products are approved for such applications provided they meet wind uplift requirements for FM 1-90:
 - 1. Insta-Stik Professional Roofing Adhesive as manufactured by Flexible Products Company, 1500 Clearwood Drive, Joliet, IL 60435-3187.
 - 2. OlyBond Adhesive Fastener as manufactured by Olympic Manufacturing Group, 153 Bowles Road, Agawam, MA 01001-0508.
 - 3. Adhesive recommended by roof system manufacturer for their rated assembly.

2.05 FASTENERS

- A. Steel Deck Fasteners - Fasteners equal to Olympic Factory Mutual approved #12 with a CR-10 fluorocarbon coating with a .172 diameter shank and .220 diameter thread to be used with Olympic round pressure plates. Fastener must penetrate the deck a minimum of 1/2". Pressure plates may be of galvanized steel or polypropylene. Fasteners long enough to penetrate to the bottom of deck flutes are NOT acceptable.
 - 1. Roofgrip #12 as manufactured by Buildex, A Division of ITW
 - 2. #12 Standard Roofing Fasteners as manufactured by Olympic Mfg. Group, Inc.
- B. Corner and Perimeter Fastening - All perimeter and corner fastening of insulation or base plies shall be in accordance with Factory Mutual requirements. The Contractor shall submit the fastening pattern with other submittals. When an approved fastening pattern has not been submitted or approved in advance, the default fastening pattern for perimeters shall be 150% of

the field pattern and quantity, and the corners shall be 200% of the field pattern. The perimeter is defined as 10' in from edge, and the corner is defined as a 10' x 10' area, or as otherwise defined by Factory Mutual if different.

PART 3 EXECUTION

3.01 INSPECTION AND PREPARATION OF DECK

- A. Tear off roofing and prepare deck as specified elsewhere.
- B. Inspect the deck to see that all requirements for deck preparation specified elsewhere have been met and that the deck meets the following requirements for application of the roof materials:
 - 1. The deck must be smooth, free of voids and holes, and all damaged areas replaced or repaired.
 - 2. Ensure that metal decks have side laps fastened at 36 inches O.C.

3.02 INSTALLATION OF INSULATION - General

- A. Insulation, having been protected as stipulated elsewhere in these documents, shall be installed in the following manner in accordance with the manufacturer's printed instructions.
- B. Edges - At edge details, or where edge nailers are present at the perimeter, butt the outside edge of the tapered insulation terminating piece against the roof side edge of the nailer. Do not extend the tapered insulation out onto the nailer.
- C. Where wind uplift requirements or standards require wood nailers shall be installed at the perimeter. Such nailers shall be attached by using suitable fasteners with pre-drilled holes. Attachment with nail guns is not permitted. Joints shall be staggered and subsequent layers attached with screws, not nails. The combined thickness or height of nailers shall be equivalent to the combined layers of all insulation and cover boards.
- D. All perimeter and corner fastening of insulation or base plies shall be in accordance with Factory Mutual requirements. The Contractor shall submit the fastening pattern with other submittals. When an approved fastening pattern has not been submitted or approved in advance, the default fastening pattern for perimeters shall be 150% of the field pattern and quantity, and the corners shall be 200% of the field pattern. The perimeter is defined as 10' in from edge, and the corner is defined as a 10' x 10' area, or as otherwise defined by Factory Mutual, if different.
- E. Where field observation determines fasteners to be installed at a greater spacing than specified, one additional fastener shall be installed between each existing fastener as a remedial measure. Failure to install fasteners at the required spacing interval will be considered a serious act of defective workmanship and may cause replacement of the entire roof assembly.
- F. Wood Blocking Insulation Stops - Where the slope of the deck exceeds 1" per foot, wood insulation stops shall be installed. The wood blocking shall be installed in multiple layers with the joints staggered. The thickness shall equal the thickness of the roof insulation, and shall be

secured attached to the deck at 12" O.C. Insulation stops shall be installed at a maximum spacing of 8'0" I.D. unless otherwise approve differently in advance. Additional insulation stops shall installed at the ridge and eave of the roof.

- G. Joints of all layers of insulation shall be tight, square, and not exceeding 1/4". Joints shall be staggered 1/2 the length of the board in one direction. If alignment gets out of square, do not continue. Stop the installation, lay a chalk line, cut the insulation smoothly using a power cutter or other device, and square up the installation. After obtaining a straight and square installation resume laying the installation in a pattern to accommodate the revised and squared up alignment. All corner pieces should be carefully mitered to produce a snug fit without excessive voids at penetrations, projections, curbs, or terminations.
- H. Isocyanurate insulation shall be used in multiple layers with no layer exceeding 2" thickness. The second and subsequent layers of insulation and cover board shall be imbedded in a full application of low-rise foam adhesive with the joints in the second and subsequent layers of insulation and cover board staggered at least 12" in each direction from the underlying layer. At no location shall a joint of the top layer fall over a joint in the bottom layer except when crossing at 90 degrees. The joints on the top layer must be staggered at least 12" in both directions from the joints in the bottom layer.
- I. Ensure that all low rise foam beads are at the proper interval, and that insulation is adhered before the adhesive skins over. Walk in all pieces to ensure full adhesion. Fill all voids greater than 1/4" with insulation pieces to avoid thermal energy loss. Lack of adhesion of insulation shall be considered defective workmanship and will be rejected.
- J. Cover All Insulation - Under no circumstances shall applied insulation be left overnight without a roof covering in place. Any roof insulation installed, but not covered by roofing material before quitting time shall be torn off and replaced the following day.

3.03 INSTALLATION OF INSULATION - Metal DECK

- A. The first layer shall be screwed down to the steel deck in accordance with requirements for Factory Mutual 1-90 requirements. Screws shall be applied at the rate and in the pattern approved for the roof assembly by Factory Mutual Engineering.
- B. Fasteners shall penetrate the deck a minimum of 3/4". Fasteners shall not be long enough to reach the bottom of the flute, and accordingly fasteners shall not penetrate the deck more than 1 inch. Using a power screwdriver, drive the fastener until a slight depression is visible in the insulation around the plate or a dimple is visible in the surface of the plate. Take care not to overdrive the fasteners and fracture the facer sheet of the insulation. Fasteners must be tight enough that the plate does not turn.
- C. In areas where mechanical attachment is utilized, if screws coincidentally align with a concealed underlying deck flute or hole, the Contractor shall remove the offending screw completely. The Contractor may either adjust the screw location by up to 2" in any direction to contact a flush face of the deck. Use of longer fasteners to reach the bottom of the flute is not permitted. The Contractor shall use extra fasteners as required to smooth out irregularities. All fastening

patterns are to be in accordance with Factory Mutual Engineering published standards for the assembly being utilized on this project.

3.04 INSTALLATION OF Tapered INSULATION

- A. Slope - All tapered insulation systems shall provide a minimum 1/4" in 12" slope unless stipulated otherwise on the Drawings. The slope shall be maintained on all crickets, tapered edges, and the main roof area.
- B. Minimum Thickness - A minimum of 3/4" fill board and tapered board is to be used throughout the project, and at no point, unless shown otherwise on the Drawings, shall the minimum thickness be less than 3/4". The tapered insulation board shall be in addition to the minimum thickness of the fill board.

3.05 CRICKETS

- A. Tapered crickets shall be installed between all roof drains (saddles), at all walls sloping back or in the reverse toward drains (kick-backs), and on the high side of all raised curbs, equipment, skylights, or access hatches of any type (crickets) whether shown on the Drawings or not. All such crickets shall have a counter-slope of twice the underlying slope or a slope sufficient to result in a 1/4" per foot counter-slope, unless otherwise approved.
- B. Crickets, saddles, and kick-backs are to be installed in sequence with the insulation, not after the cover board or roof membrane is installed. No cover board or roofing plies are to be installed between the cricket materials and the top layer of insulation.

END OF SECTION 07 22 00