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6.01.1 Roof Insulation — General

- A. Roof insulation aims to provide a smooth, clean, dry, and firmly attached substrate to receive the roofing system while providing insulating value against the transmission of heat and cold.
- B. Insulations not manufactured by IKO and intended to be used in conjunction with an IKO warranted roof assembly must be approved by the IKO Technical Services department before work commencement.
- C. IKO reserves the right to accept or reject any roof insulation as an acceptable substrate for attachment of an IKO roofing system.
- D. Sprayed-in-place polyurethane foam is not an acceptable substrate to receive an IKO roofing system.
- E. Roof insulation must, at all times, be protected from being directly exposed to the elements.
- F. The roof insulation must be manufactured for the express use as roof insulation.
- G. The roof insulation must be able to withstand normal construction traffic without crushing.
- H. On the metal decks, the roof insulation must be strong enough to span the flutes without breaking under typical rooftop traffic. Contact the insulation manufacturer for maximum flute spanability on steel roof decks.
- I. The insulation manufacturer must accept responsibility for any manufacturing defects that occur in the insulation.
- J. The heat-fused modified bitumen membranes should not be directly torched to combustible insulations or insulations with combustible facers.
- K. Insulation thicknesses and the use of multiple insulation layers may vary to meet regional code compliance. Consult the local building code for current requirements.
- L. Where the specified insulation values will result in an insulation thickness more than four inches (4") (100 mm), it is recommended to use thinner boards in multiple layers to achieve the same insulation value.

6.02.1 Roof Insulation — Types and Mandatory Compliances

- A. Roof insulations must comply with all the applicable building codes.
- B. Flat board stock polyisocyanurate insulation should never be used in a single thickness less than one inch (1") (25 mm) when used as the sole primary roof insulation or as the external insulation above an inverted roof membrane system.
- C. Polyisocyanurate shall comply with the CAN/ULC-S704 and, as an option, may also comply with the ASTM C 1289.
- D. Expanded and extruded polystyrene insulation must meet the CAN/ULC-S701 and, as an option, may also comply with the ASTM C 578. Extruded polystyrene is suitable for roof systems with exposed insulations (such as inverted roof assemblies). Note 1: The IKO Technical Services department does not recommend extruded polystyrene insulation as the sole insulation layer while constructing a conventional roof assembly. Note 2: Polystyrene insulation must be covered by a minimum of two inches (2") (50 mm) of IKOTherm polyisocyanurate insulation to protect it from distortion within the roof assembly.
- E. Mineral wool roof insulation must comply with the CAN/ULC-S702. Mineral wool may be used as a secondary insulation and/or as a separation panel depending upon the roof design.

6.03.1 Wood Nailers Installation

- A.** On new construction or complete tear-off projects, wood nailers must be kiln-dried structural grade number two (#2) or better. For re-cover projects and new construction projects where a poured-in-place deck is specified, wood nailers must be pressure treated for rot resistance and number two (#2) or better lumber. Asphaltic, creosote, or field treatment for rot resistance lumber is not acceptable.
- B.** Wood nailers are required at the following locations:
 - 1. At all roof edges where the parapet walls or adjoining walls are not present to serve as insulation stops.
 - 2. At all locations where sheet metal is used and not fastened directly to the roof deck.
 - 3. At sixteen feet (16') (4.9 m) on the center and perpendicular to the slope on the insulated roof decks with slopes between one inch (1") and two inches (2") (8% to 17%) to the horizontal foot.
 - 4. At eight feet (8') (2.4 m) on the center and perpendicular to the slope on the insulated roof decks with slopes between two to three inches (2" – 3") (17% to 25%) to the horizontal foot.

5. At four feet (4') (1.2 m) on the center and perpendicular to the slope on the insulated roof decks with slopes greater than three inches (3") (25%) to the horizontal foot.
 6. At all other locations where a nailable substrate is required in order to complete the roof system assembly.
- C.** The wood nailer height shall match the total thickness of the specified insulation and shall be installed with a one-eighth inch (1/8") (3 mm) gap between each length and each change of direction. If applicable, the wood nailers shall be trimmed to the same height as the insulation.

6.04.1 Roof Insulation — Installation

- A.** Install only as much insulation as can be covered with the completed roof assembly within the same day.
- B.** Do not install wet, damaged, warped, or defective insulation.
- C.** Install the insulation boards in a staggered joint fashion in one direction. If there are multiple layers of insulation, all the joints between the boards in subsequent layers must be staggered a minimum of twelve inches (12") (300 mm) in both directions.
- D.** Install the insulation boards so that the sides and ends of the boards make contact along the entire length and width. Do not kick the insulation boards into place.
- E.** The gaps between the insulation boards that exceed one-quarter inch (1/4") (6 mm) must be filled with similar insulation material.
- F.** Fit the insulation neatly around all the penetrations and nailers.
- G.** Tapered insulation is recommended around all the drains to create a sump for drainage. Mitering insulation is recommended at the drain sump points to minimize sharp edges/transitions. It is recommended that the drain sumps be located a minimum of one-half inch (1/2") (13 mm) below the finished roof surface.
- H.** The insulation boards shall be mitered and filled at any slope ridges to prevent open joints.
- I.** The insulation boards must be firmly attached to the substrate with screws and plates, hot asphalt, or adhesives. Secure the insulation as specified by the system performance level required.
- J.** Where required, install saddle or cricket systems in accordance with the roof specifications.

- K.** Hot asphalt or heat-applied roofing membranes may not be applied directly over the insulation without first installing a separation panel.
- L.** When hot asphalt is applied indirectly over the expanded polystyrene insulation boards, precautions shall be taken to prevent the asphalt from contacting the insulation (through joints/gaps). For example, where a single layer of the separation panel is specified, all the joints in the separation panel layer shall be taped or sealed.

6.05.1 Roof Insulation — Attachment

- A.** IKO is not responsible for damage to the roofing membranes or flashings from movement or wind uplift due to inadequate attachment of the roof insulation to the roof deck. Note: For IKO polyisocyanurate insulation, the patterns for adhesive-attachment apply to all the approved thicknesses of the insulation specified. However, the mechanical attachment patterns for the approved thicknesses of the insulation will vary depending on the specified insulation thickness. See Part 8 of this manual and contact the IKO Technical Services department for further details.
- B.** Unless otherwise specified, the fastening requirements shall be in accordance with the patterns detailed in Part 5.

6.05.1.1 Mechanical Attachment of Insulation

- A.** Only screws and plates are acceptable mechanical fasteners for the insulation. All screws and plates used to attach the insulation shall meet the corrosion resistance requirements of the FM Standard 4470 and must be accepted by IKO before installation.
- B.** The nail attachment of the roof insulation to a nailable deck is not acceptable.
- C.** The following minimum penetration requirements shall apply to the mechanical fasteners used to fasten into each deck type. The penetration is measured from the top surface of the deck and includes the tapping point of the fastener.
 - Steel: three-quarter inch (3/4") (19 mm)
 - Concrete: one inch (1") (25 mm)
 - Plywood or Wood Plank: one inch (1") (25 mm)

- D. Thermal bridging can be expected at every fastener and plate when a single layer of the insulation is mechanically fastened directly under the roofing membrane. Thermal bridging can be avoided by using two layers of insulation. The second layer of the insulation shall be hot asphalt or adhesive attached to the mechanically attached first layer. The joints in the second layer of the insulation shall be off-set from the joints in the first layer a minimum of twelve inches (12") (300 mm).

6.05.1.2 Hot Asphalt Attachment of Insulation

- A. If hot asphalt attachment of the insulation is selected by the architect, engineer, or building owner, then the following is required:
1. The specified insulation must be compatible with the roof deck, the specified asphalt, and the performance requirements of the selected IKO roofing system.
 2. A full coat of asphalt shall be applied at the rates and temperatures referenced in Part 5.
 3. Direct hot asphalt attachment of the expanded polystyrene insulation is not permitted. However, indirect attachment techniques have been used with acceptable results, such as "mop and flop."
 4. When hot asphalt must be applied to the IKOTherm insulation (be it attachment to an approved substrate, to itself, or to other board products or to other such products necessary to complete a fully adhered roof assembly), the asphalt application temperature shall not exceed 199°C (390°F) at the point of contact.
 5. Maximum board sizes should not exceed three feet by eight feet (3' x 8') (914 mm x 2440 mm) or four feet by four feet (4' x 4') (1220 mm x 1220 mm).

6.05.1.3 Cold Adhesive Attachment of Insulation

- A. Before the application of any cold adhesive, ensure that the products are compatible and that their use meets the performance requirements of the roof system.
- B. Should there be any doubt about the use of an adhesive not referenced in this manual, consult the IKO Technical Services department before using.
- C. The IKO-approved adhesives used to adhere the insulation panels shall follow the procedures outlined in the appropriate sections of Part 5 in this manual.

- D. Secure the separation panels as specified by the system performance level required by adjusting the row spacing pattern of the adhesive and not the bead size.
- E. The maximum board sizes should not exceed three feet by eight feet (3' x 8') (914 mm x 2440 mm) or four feet by four feet (4' x 4') (1220 mm x 1220 mm).

6.06.1 Cant Strip Installation

- A. Where applicable, cant strips may be used at the intersections of the roof and walls, parapets, curbs, or angle changes greater than forty-five degrees (45°) that are to be flashed in. Cant strips are required for all the built-up roofing membranes containing at least one ply of organic or glass felt; they are not required for the modified bitumen membrane systems.
- B. Cant strips may be mechanically fastened with the acceptable fasteners and set in hot asphalt or cold adhesive. Independent approval organizations may specify mechanical fastening only.
- C. Cant strips can be made of wood, perlite, fiberglass, or concrete. Cant strips shall be approximately four inches (4") (100 mm) in horizontal and vertical dimension. The face of the cant shall have an incline of no greater than forty-five degrees (45°) with the roof. Wood cant strips should be solid and rot resistant. Wood cants shall be used when the mechanical attachment of the related roof components to the cant is required or when solid wood cants will help stabilize the vertical wood nailers.
- D. To be most effective, cant strips shall be positioned level with the finished roof substrate surface and directly beneath the membrane. All cant strips shall be butted neatly at the joints and mitered at the inside and outside corners.
- E. Metal cant or metal curb strips are not acceptable.
- F. Cant strip materials may be combustible. The decision on which cant material is appropriate is the decision of the architect, engineer, building owner, or roofing contractor.

End of Section