

07 50 00 Membrane Roofing

Revision 01/04/2019

Purpose:

The Architect and/or Engineer shall incorporate the Rice specific requirements indicated in this standard's section into their design. The Architect and/or Engineer shall further produce project specifications in line with industry standards that are updated to reflect these Rice specific requirements.

1. All new roof designs must meet the following current building code (2012 HBC) and current energy conservation code (2015 Houston Commercial ECC) requirements.
 - a. The new roof construction and roof edge systems must be able to withstand current code-required wind loads (based on ASCE 7-10). The Houston Building Code (HBC) stipulates that the new roof system must be able to sustain a 110-mph "Nominal Design Wind Speed" (or an equivalent "Ultimate Design Wind Speed" of 150-mph), as defined in Section 1609.3 of the 2012 International Building Code (IBC).
 - b. To meet current code requirements, the new roof construction must achieve a minimum 2-percent slope (1/4-inch per foot) to ensure positive roof drainage. Therefore, a (high energy-performance) tapered insulation system and/or properly sloped structural roof deck must be incorporated into the new roof construction to meet this requirement.
 - c. The 2015 International Energy Conservation Code (IECC), and (more specifically) the City of Houston Energy Conservation Code 2015, stipulates that the minimum (combined) R-Value for all "above-deck" roof components must be R-25. Therefore, either high energy-performance tapered insulation systems or cellular insulating concrete fill deck materials must be incorporated into the new roof design in order to meet this requirement.
 - d. All new roofs must meet the following reflectivity/emittance requirements stipulated in the City of Houston "Cool Roof Guidelines" (attached).
 - i. Solar Reflectance: the ratio of the light reflected by a surface to the light incident upon it. Minimum 0.70 required. If the roof is to be LEED certified, the requirement may be higher (please check LEED for specific requirements): the minimum Solar Reflectance must be 0.83 and (If a 3-year aged SRI value is available for the material, that value must exceed 64).
 - ii. Thermal Emittance: the ratio of the radiant heat flux emitted by a specimen to that emitted by a blackbody at the same temperature and under the same conditions. Minimum 0.75 required.
 - e. To achieve long-term durability, the following Roof System Specification requirements must be met:
 - i. For all structural roof decks other than normal-weight structural concrete: the 1st (bottom) layer of flat-stock, Polyisocyanurate rigid foam board ("Polyiso-board") insulation must be mechanically attached to the structural roof deck with insulation plates and screws.
 - a) The insulation board size may be either 4 ft. X 4 ft. or 4 ft. X 8 ft.
 - b) For steel roof decks: a "thermal barrier", consisting of minimum 1/4-inch thick gypsum fiber board, is usually installed between the steel roof deck and the 1st insulation course to increase the roof assembly's fire resistance. It can either be loose-laid or spot-attached prior to the insulation board installation.

- ii. For normal-weight structural concrete roof decks: the 1st (bottom) layer of Polyiso-board insulation should be applied in ribbons of insulation adhesive at maximum 6" spacings in the roof "Field"; see FM 1-29 for roof Perimeter and Corner zone enhancements. Note: the insulation board size must be limited to 4 ft. X 4 ft.
 - a) For normal-weight structural concrete roof decks, a cellular lightweight insulating concrete (CLIC) fill may be considered in lieu of tapered Polyiso-board insulation systems. CLIC decks are "sustainable" because they can be reused during future roof replacements (i.e. only the roof covering needs to be replaced).
 - i. The required minimum R-Value (R-25) can be achieved with CLIC decks when Expanded Polystyrene (EPS) foam board insulation is installed in conjunction with the CLIC placement.
 - ii. "Wet decks", such as poured-in-place (vermiculite or perlite aggregate) lightweight insulating concrete (LWIC) fill decks, are not permitted.
- iii. Subsequent layers of 1/4-inch per foot tapered Polyiso-board insulation are adhered to the bottom layer of flat-stock Polyiso-board insulation in ribbons of insulation adhesive at maximum 6" spacings in the roof "Field" (see FM 1-29 for roof Perimeter and Corner zone enhancements). Tapered insulation board size must be limited to 4 ft. X 4 ft.
 - a) Depending on the roof size and configuration, a minimum "overall average" R-Value of R-25 can usually be achieved when 1 layer of mechanically attached, 3-inch thick, flat-stock Polyiso-board insulation is followed by a 1/4-inch per foot tapered Polyiso-board insulation system.
 - b) Tapered Polyiso-board insulation crickets and saddles must provide a minimum 1/2-inch per foot tapered slope between interior roof drains.
- iv. A gypsum fiber cover board (either fiberglass-faced or un-faced) must be installed over tapered Polyiso board insulation systems in order to increase the roof assembly's overall wind uplift resistance. The cover board is applied in ribbons of insulation adhesive at maximum 6" spacings in the roof "Field"; see FM 1-29 for roof Perimeter and Corner zone enhancements. The cover board will also improve roof membrane impact resistance and puncture resistance. Cover board size must be limited to 4 ft. X 4 ft.
- v. The roof membrane specification must be a 2-ply Modified Bitumen Roof (MBR) membrane system consisting of: (1) a highly reflective (see COH Cool Roof Guidelines), torch-applied MBR cap sheet; and (2) a smooth-surfaced MBR membrane base ply (either torch-applied or installed in cold-process adhesive).
- vi. All base flashing specifications must consist of 2-ply MBR flashings (torch-applied).
- vii. All "metal roof edge systems" (gravel stops, edge metal, copings, etc.) must meet the wind resistance requirements of ANSI/SPRI ES-1, "Wind Design Standard for Edge Systems used with Low-Slope Roofing Systems".
- viii. Roof Drainage: The finished roof slope(s) provided on the Drawings should ensure that no water ponds on the roof 24 hours after a rainfall. "Ponding" is defined as any standing water that exceeds 1/2-inch depth in any area exceeding 50 SF for more than 24 hours after a rainfall (note: this specification requirement may or may not be more stringent than any particular roofing manufacturer's requirements).