9. MB - SECTION 9 – PROTECTED MEMBRANE & COMBINATION DESIGNS

9.1. General

9.1.1. A protected membrane roofing design is an insulated and ballasted roofing system in which the insulation is applied above the modified bituminous membrane and retained in place by ballast.

9.1.2. A combination roofing assembly is comprised of a conventional insulated membrane system where the modified bituminous membrane is covered with insulation held in place with ballast.

9.1.3. Protected membrane and combination designs do not require back nailing of the membrane plies for roof slopes 1:8 (12.5%) and greater.

9.2. Drainage

9.2.1. For protected membrane and combination designs the drainage slope shall be a minimum 1:50 (2%). For re-roofing projects see Section 10 – Reroofing, Item 10.5.

9.2.2. The maximum roof slope is restricted to 1:6 (16.7%).

9.2.3. When flow control drains are incorporated into the roof drainage system, membrane level scuppers shall be provided at the roof perimeter as emergency drainage. Roof drains and scuppers must have gravel screens installed when gravel ballast is specified. Drainage openings are not permitted through expansion joints.

9.3. Penetrations and Perimeter Heights

9.3.1. Except for roof drain and pedestal fall protection roof anchors, all membrane penetrations shall be contained within or supported by a curb secured to the structure or decking.

9.3.2. Roof parapets, roof/wall junctions and membrane penetrations including curbs, area dividers, equipment supports and pedestal fall protection anchors shall extend a minimum distance of 200mm (8") above the surface of the insulation when using gravel ballast or above the surface of concrete pavers when they form the ballast.

9.3.3. Pedestal fall protection roof anchors shall be waterproofed with an ARCA Warranty Ltd. approved one-piece manufactured metal specialty flashings. The one-piece metal specialty flashing shall incorporate a minimum 100mm (4”) wide integral flange.

9.3.4. Roof area dividers are not required for protected membrane designs.

9.4. Membrane Flashing

9.4.1. A minimum of two (2) plies of S.B.S. modified bituminous membrane flashing shall be installed at internal roof drains, parapet, curb and wall junctions.

9.4.2. When gravel ballast is specified, the vertical extension of the membrane flashing shall terminate a minimum vertical distance of 200mm (8”) above the surface of the insulation.

9.4.3. For concrete pavers or concrete topped insulation systems, the vertical extension of the membrane flashing shall terminate a minimum distance of 200mm (8”) above the top of the concrete surface.

9.5. Insulation

9.5.1. The roof insulation shall be Type 4 extruded polystyrene insulation loose-laid over the membrane

9.5.2. Roof insulation 100mm (4") thick and less shall be installed in a single layer.

9.5.3. For multi-layer insulation applications, the base layer of insulation boards shall not be less than 100mm (4”) thick. When using more than one insulation layer, the board joints shall be offset a minimum distance of 300mm (12”) from the joints of the previous insulation layer.

9.6. Ballast

9.6.1. Poured-in-place concrete topping ballast is not accepted for Warranty Certificate issuance.

9.6.2. The ballast may be comprised of rock or concrete pavers.

9.6.3. Gravel (rock) ballast shall be relatively free of fines and other foreign matter and shall contain gravel sizes between 19.0mm (3/4") and 38mm (1 1/2") in diameter and shall conform to ASTM D7655 "Standard Classification for Size of Aggregate Used as Ballast for Membrane Roof Systems".

9.6.4. An acceptable filter fabric must be installed over the insulation when using gravel ballast. Filter fabric shall extend up any membrane flashing and be placed under metal flashing where metal flashing is required.[65]

9.6.5. A minimum ballast mass of 50 kg/m² (10 lbs/ft.²) is recommended over the field of the filter fabric and loose-laid insulation. With the minimum gravel ballast mass, the filter fabric may be visible. For thick insulation layers, consult with the insulation manufacturer for ballasting requirements.

9.6.6. For concrete paver ballast, the weight of individual pavers shall not exceed 45 kg (100 lbs.) in mass. When using a paver ballast system, the pavers shall be elevated above the insulation to provide an air space between the paver and the insulation. Pedestals or insulation strips shall be employed to elevate the concrete pavers above the surface of the Type 4 extruded polystyrene insulation boards. Paver ballast shall not be placed on a bedding medium.

9.6.7. The design parameters of the roof structure itself must include the weight of the newly installed ballasted roofing system. The structure must be capable of supporting the weight of the roofing system plus the specified ballast without encroaching on the necessary live load allowance and without creating or aggravating water ponding problems. A design professional should be consulted to certify that the structural system will support these loads.

9.7. Sheet Metal Flashings

9.7.1. Drip edge flashings are not accepted for roof edge terminations at membrane level.

9.7.2. For a gravel ballast system, the sheet metal base flashings, when required, shall contain a minimum 50mm (2”) wide horizontal leg that rests on the top surface of the insulation.

9.7.3. With paver ballast, the 50mm (2”) horizontal base flashing, when required, leg shall rest on the surface of the paver.

[65] MB 9.6.4 Revised February 5, 2021 (TB-2021-02)

9.8. Roof Terraces

9.8.1. Roof Terraces are to be installed over a minimum 6.4mm (1/4") asphalt impregnated core board membrane protection layer.

9.8.2. The designer must take into consideration the compressive strength of the underlying materials to prevent damage to the insulation and roofing membrane from concentrated loads exceeding 91kg (200 lbs.) in mass or when roof point loads exceed 5 kPa (105 PSF) which may exceed design limits.[66]

9.8.3. Roof areas with roof terraces are eligible for five (5) or ten (10) year Warranty Certificates only.

9.8.4. The cost to remove and replace the roof terrace material to facilitate access to the roof membrane for investigation and repair of workmanship related leaks is included however; it is the responsibility of the building owner to cover costs for removal and replacement of items that were not installed by the roofing contractor. It is recommended that the design of the roof terrace incorporate future service and maintenance requirements.

9.8.5. Roof leaks as the result of membrane damage due to the work and activities of others, maintenance or from contaminants are not covered under the Warranty Certificate.

[66] MB 9.8.3 Revised February 11, 2022 (TB-2022-01)