

1.0 **GENERAL**

1.1 **Related Work and UBC Guidelines**

- .1 Section 07 00 10 Building Envelope – General Requirements
- .2 Section 07 21 00 Thermal Insulation
- .3 Section 07 55 63 Vegetated Protected Roofing
- .4 UBC LEED Implementation Guide
- .5 UBC Energy Modelling Guidelines
- .6 Owner's Project Requirements

1.2 **Related External Documents**

1. Latest edition of the British Columbia Building Code (BCBC).
2. RCABC Roofing Practices Manual.

1.3 **Description**

- .1 Work includes 2- ply SBS membrane roofing system complete with all related assembly components, fasteners, adhesives, cover boards, underlays, insulation, membranes and all roof related hardware and flashings as appropriate to the building and as specified.
 - .1 In addition to the above, and in the case of re-roofing, the assembly shall include wood blocking additions and/or modifications as required to meet the requirements of the new roofing assembly.

1.4 **Coordination**

- .1 The Guidelines apply to all work completed within buildings on both UBC Vancouver and UBC Okanagan campuses unless stated otherwise.
- .2 In instances where conflicts are found between these guidelines and provincial regulations or codes, please notify the UBCV Technical Review Team Architect or UBCO Facilities Management.
- .3 These guidelines are intended to be read by design consultants and their content integrated into construction drawings and specifications. Construction documents are not to reference the technical guidelines directly.
- .4 The Registered Coordinating Professional (CRP) is required to coordinate these requirements with other disciplines.

1.5 **Submittals**

- .1 Submit required documents to consultants in accordance with Section 013300 Submittal Procedures
- .2 O&M Submittals
 - .1 Manufacturer's product data sheet for each product provided, type and colour, including MSDS data.
 - .2 Manufacturer performance test data to confirm performance criteria.
 - .3 Sloped insulation, cricket and/or back slope plan.
 - .4 Manufacturer's leakproof warranty.
 - .5 Manufacturer's confirmation of training – if needed.
 - .6 Fastening patterns and sheet layout for mechanically attached membrane assemblies.
 - .7 Environmental Product Declaration (EPD)

1.6 **Quality Control and Assurance**

- .1 Quality Assurance
 - .1 Meet or exceed the RoofStar Guarantee 5-Year guarantee standards All roofing system products to conform to the RoofStar Guarantee Standards and to the appropriate CSA, CGSB, ULC, CULC, and ASTM Standards for the materials used in the roofing system; products to be listed in the RGC Accepted Materials List of the RoofStar Guarantee

Roofing Practices Manual, and to be in conformance with the manufacturers' published product and performance data.

- .2 Quality Control
 - .1 An Independent Inspection Agency acceptable to RoofStar Guarantee, and assigned by RoofStar Guarantee on acceptance by the Consultant and the UBC Project Manager, to conduct field review inspections as per the minimum protocols as set forth by the RoofStar Guarantee for their 5 Guarantee Program. It is understood that in addition to these responsibilities the independent inspection agency will provide re-inspection services at the 2year anniversary – in the case of the 5 year warranty.
 - .1 Cost for the warranty and inspections are to be included in the contract sum.
 - .2 UBC reserves the right to increase the field review inspection frequency to FULL TIME site inspections while the work is in progress. Extra costs for this to be borne by UBC.
 - .3 Added inspections just prior to the expiration of the warranty, if required, will be arranged and the costs borne by UBC.
 - .4 A manufacturer's representative to also inspect the work as required for the purposes of providing the manufacturer's labour, material and workmanship warranty upon completion.

1.7 Warranties

- .1 Provide the RoofStar Guarantee Roofing System Record, to include the RoofStar Guarantee standard 5-Year Guarantee, copies of Inspection Reports, listing and literature of all products used, and Roof Maintenance Guide.
- .2 Provide a manufacturer's warranty certificate, including any extended warranties.
- .3 Where adhesive is used in the assembly, include and provide the adhesive manufacturer's warranty.
- .4 Active or passive roof leak detection system warranty.
- .5 All warranties to commence at date of Substantial Performance.

2.0 DESIGN AND PERFORMANCE REQUIREMENTS

2.1 Design Requirements

- .1 Roofing is to be designed to meet Guarantee Standards of the Roofing Contractors Association of British Columbia Guarantee Corp. (RoofStar Guarantee) as published in the "RGC Roofing Practices Manual" ("RPM") and requires a minimum 5 (five) year RoofStar Guarantee.
- .2 Roofing is to be designed to CSA 123.21 Wind Uplift Standards.
- .3 New and re-roof assemblies shall have a minimum of 2% slope to drain. This can be achieved by structural slope, sloped insulation, cricket and back slopes or any combination of these.
 - .1 A variance request will need to be granted for any deviations. Consideration will only be given where existing building conditions will not allow for excessive tapered insulation elevations, for example, low window sills, low door thresholds or poor drain locations.
- .4 The design service life of low-sloped roofs is to be a minimum of 25years
- .5 As per RCABC requirements, for green roofs at grade or roof level (inverted roofs) with soil or landscape buildup or cast concrete or asphalt (non-removable topping), a RoofStar Guarantee approved passive roof leak detection system must be included in the assembly. Inverted roofs with gravel ballast or pavers do not need to have a roof leak detection system as these are easy to open up and leaks can be traced when required. Refer to 3.1..4 in this section for further details.
- .6 An active (monitored) roof leak detection system is required for high value buildings such as museums, libraries and research facilities. Libraries with conventional roof systems can be provided with a passive leak detection system.
- .7 Initial EFVM scan and leak locate system is required for all inverted roof assemblies.
- .8 Monitored leak detection is NOT Required in the following situations:
 - .1 Conventional roofing over steel deck or vented wood space.

- .2 Conventional roofing over concrete deck.
- .9 Performance standards for roof insulation are set out in Section 07 21 00 Thermal Insulation
- .10 The installation of concrete or asphalt topping over 2 ply SBS membrane roofing is not permitted. A variance will need to be granted for such installations.
- .11 Hot rubberized asphaltic type membrane is acceptable where hard to access surfaces are present.
- .12 Vapour retarders are to be included in all assemblies and shall be fully adhered to the substrate. Products shall be appropriate to the building envelope configuration and be installed so as to wrap and envelope the insulation, compatible for connection to the building envelope air barrier, and be sealed at all penetrations. Laminate Kraft paper and adhesive is not an acceptable vapour retarder.
- .13 In conventional roof assembly, insulation is to be adhered with two-part urethane adhesive. In the case of conventional roof assembly over wood frame decking, screw fasten the first layer and adhere the upper layers (this reduces thermal bridging and eliminates washer heads at fasteners from showing through the roofing membrane).
- .14 Insulation overlay board is to be installed over the insulation and under the roof membrane in all cases even if manufacturers' minimum standards do not require it. This requirement would also apply with mineral fiber insulation board which have an integral facer to receive the membrane.
- .15 Roofing membranes are to be fully adhered, or torched applied 2 ply SBS modified bitumen membrane. A variance will need to be granted for alternative roofing membranes. A variance request noting the performance comparisons with a 2 ply SBS membrane roof will need to be provided for review.
 - .1 For re-roofing projects, systems and assemblies that do not require the use of hot asphalt, kettles or tankers are to be used.
- .16 Drains
 - .1 For new construction all drains shall be cast iron and include all appropriate hardware.
 - .2 Cast iron drains shall be re-used when re-roofing, and complete with drilled and tapped stud holes and new hardware as required to function as originally designed and installed.
 - .3 At all cast drains, tie-in is to be done with the application of reinforced PMMA stripped into the drain.
 - .4 All drain baskets, strainers or screens shall be cast iron or aluminum, plastic will not be permitted.
 - .5 The use of drain inserts will only be considered when dictated by building configurations or circumstance. A variance will need to be granted for such instances.
 - .6 If drain inserts must be used a "U-Flow" or Menzies "Blue Seal" connection seal shall be utilized when a hard plumbing connection is not possible. O-rings are not acceptable.
 - .7 All drains are to be sumped minimum 2' with sumps turned 45° degree to direction of roofing plies.
- .17 Membrane plies are to extend over the top of all parapets and 50 mm down past blocking and lapped over the outside surface of the wall finish. Where nailable substrates exist, the membrane shall be mechanically secured (nailed) on the outside face.
- .18 Where the top edges of the stripping plies terminate on higher walls the stripping plies are to terminate in such a way as to obtain two seals on the vertical wall face (cap stripping to extend up past base sheet and obtain a separate seal to the substrate).
 - .1 All stripping plies shall be mechanically terminated to the substrate at least 200 mm above the roof surface.
 - .2 Top edges of membranes are to be protected by counter flashings.
 - .3 In new construction, reglets will be installed to allow for the installation of membrane plies and or flashings. Gum lip flashings are not permitted.
 - .4 In re-roofing projects where reglets cannot be re-used or are not present and gum lip flashings must be used, installation shall be "double gum lip" as per RCABC Guarantee standards RPM detail.
- .19 Install walkway paths at all access door and hatches, around all rooftop mechanical and other equipment requiring maintenance, and from there leading to the main roof access stairs, ladders, or roof hatch.

- .20 Provide overflow scuppers in accordance with the latest applicable edition of the British Columbia Plumbing Code. Install overflow scuppers at height below the height of door sills wherever possible and at a location visible and able to be maintained.
- .21 For green roof installations at grade, see requirements for below-grade waterproofing system in Section 07 10 00.

2.2 Performance Requirements

- .1 Life Cycle Expectation
 - .1 Minimum 25 year service life expectancy

3.0 MATERIALS

3.1 Product Selection

- .1 System at Low-Slope Roofs
 - .1 2-ply SBS Bituminous Modified Flexible Membrane Roofing System, exposed, insulated, adhered, generally torch-applied. Refer to RoofStar Guarantee Manual Outline Specification for this system, from which the following are preferred options for UBC.
 - .1 Thermal barrier/underlay at steel deck to be provided where required by code: shall be minimum ½" gypsum board.
 - .2 Vapour retarder is required on all roofing assemblies and shall be adhered SBS modified bitumen sheet.
 - .2 Steel or wood decks shall receive primer as prescribed by the membrane manufacturer. Membrane shall be peel and stick, self-adhered or adhered appropriate to the membrane manufacturer and the specified roofing assembly. Kraft vapor retarders are not acceptable.
 - .3 Concrete decks shall receive primer as prescribed by the membrane manufacturer. Preferred membrane application shall be fully adhered and torch applied.
 - .4 Insulation overlay shall be ¼" inch or ½" inch "Dens Deck" and be adhered or mechanically attached through to the substrate as determined by the substrate and the requirements of the assembly.
 - .1 Note that 2 (two) layers of insulation overlay are required when installed over heat sensitive insulations.
- .2 Coordinate with Section 07 21 00 Thermal Insulation for effective R value of insulation for both new and re-roofing assemblies. The effective R value of insulation is to be measured at 0°C. For new roofs, it is recommended to exceed the minimum requirements of the latest version of the BC Building Code.
 - .1 Insulation for use in conventional assemblies, the preferred roofing configuration, is polyisocyanurate or mineral fibre.
 - .2 Type I and II EPS (expanded polystyrene) insulations are permitted however are intended to be used to provide slope to drain in combination with polyisocyanurate insulation.
 - .3 Type IV XPS (extruded polystyrene) is intended for use only in inverted roofing assemblies and is to be considered only when inverted roofing is unavoidable. Use products with the lowest possible global warming potential; HFC blowing agents are not permitted.
 - .4 Insulation installed in conventional assemblies shall be installed in two layers with a minimum 12 inch offset and stagger between layers (for example 2 layers of 2 inch as opposed to 1 layer of 4 inch).
 - .5 Insulations installed in adhered assemblies are to be maximum 4' X 4' in size. Insulation installed in mechanically attached assemblies to be a maximum of 4' X 8' in size
- .2 Attachment
 - .1 For installation on wood or steel decks to meet CSA 123.21 Wind Uplift Standards and/or as required to FM (Factory Mutual) 1-90 whichever is greater.

- .2 Fasteners: minimum number of fasteners and stress plates for installation on wood or steel decks to be as specified by the RoofStar Guarantee Manual for 5/10 Year Guarantee standards and/or as required to FM (Factory Mutual) 1-90 whichever is greater.
- .3 Adhesives: adhesive application rates when used in adhering insulations and coverboards on concrete decks shall meet or exceed the requirements of the RGC, the manufacturer and FM requirements for 1-90.
 - .1 The preferred adhesive for all assemblies is a two-component polyurethane such as Insta-Stik by Dow Chemical or similar.
- .3 Roof Penetrations
 - .1 All penetration hardware to have only one line or cable per flashing installation and shall incorporate a gooseneck hood, heat shrink or uncured EPDM membrane wrap c/w stainless hose clamps. Tape, putty or caulking are not acceptable.
 - .4 Multiple lines or cables installed in only one penetration flashing is only acceptable when a purpose made hood or gooseneck is installed and that said lines or cables are slack enough to allow for a significant downward belly in the lines/cables.
- .3 Roof Level Accessories
 - .1 Install roof walkway paths from all access door and hatches, around all rooftop mechanical and other equipment requiring regular maintenance, and from there leading to the main roof access stairs, ladders, or roof hatch.
 - .1 Walkways to be either a reinforced walkway, cap sheet manufactured by the same manufacturer as the roof membrane, or 2' x 2' x 2" precast plain finish concrete paver slabs on pedestals (no substitutes such as duckboards or poured-in-place concrete).
 - .2 Install paver slabs approx. 2" inch apart and away from cants and flashings, in a regular and uniform pattern.
- .4 Roof Leak Detection Systems
 - .1 The roof leak detection system must meet RoofStar Guarantee requirements as laid out in the RCABC Roofing Practices Manual.
 - .2 Active (or monitored) roof leak detection systems must have the capability of issuing email alerts complete with a graphic of the roof indicating the location of the leak and must also be capable of issuing alarms to the BMS system.
 - .3 The roof leak detection system can be hard wired or connected via BACnet to the UBC BMS system. Project team to coordinate with the UBC BMS group.

END OF SECTION