

1.0 **GENERAL**

1.1 **Related Work and UBC Guidelines**

- .1 Section 01 33 00 Submittal Procedures
- .2 Section 03 00 00 Concrete
- .3 Section 07 00 10 Building Envelope – General Requirements

1.2 **Related External Documents**

- .1 Latest edition of the British Columbia Building Code (BCBC).
- .2 RCABC Roofing Practices Manual for horizontal waterproofing systems such as at grade green roof systems.

1.3 **Description**

- 1. Work includes dampproofing and waterproofing systems.
- 2. The Guidelines apply to all work completed within buildings on both UBC Vancouver and UBC Okanagan campuses unless stated otherwise.
- 3. In instances where conflicts are found between the UBC Technical Guidelines and provincial regulations or codes, please notify the UBCV Technical Review Team Architect or UBCO Facilities Management.
- 4. 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.
- 5. The Coordinating Registered Professional (CRP) is required to coordinate these requirements with other disciplines.

1.4 **Submittals**

- .1 Submit required documents to consultants in accordance with Section 013300 Submittal Procedures
- .2 O&M Submittals
 - .1 Manufacturers Safety Data sheet (MSD) for all toxic or potentially toxic materials.
 - .2 Environmental Product Declaration (EPD)
- .3 Product data sheets for all products used in a dampproofing or waterproofing system.

1.5 **Quality Control and Assurance**

- .1 Quality Assurance
 - .1 Membrane integrity testing of installed material properties including adhesion, material thickness and water tightness testing (where applicable) to be carried out by the Contractor at their expense.
 - .2 RCABC warranty standards are required for all waterproofed roofs, podiums, plazas / promenades and terraces. RCABC inspections are to be conducted by an approved RCABC inspection company. Vehicle parking structures (split slabs), below grade walls, foundations, and repairs or renovations to existing waterproofing systems do not require a RoofStar Guarantee.
 - .3 Contractor to provide material submittal and drawings showing any deviation from RCABC Waterproofing Standards to the UBC PM for approval and to notify UBC PM and Technical Review Team Architect of any deviations. Deviations shall be approved in writing by RCABC prior to installation in order to retain warranty coverage.
- .2 Quality Control
 - .1 Contractor to test moisture content of concrete substrate to verify that substrate moisture content does not exceed manufacturer's specifications. Submit testing results to UBC PM and Technical Review Team Architect prior to application of membrane.

- .2 Watertightness testing of applied waterproofing on horizontal surfaces by Electronic Field Vector Mapping (EFVM) scans are to be performed prior to installation of overburden, at no cost to the Owner.
- .3 Warranties
The following are required:
 - .1 First two years - Guarantee, secured by Performance Bond, commencing on the Final Holdback release due date.
 - .2 Third year to fifth year - Extended Guarantee, unsecured by Bond, commencing on the expiration of the Performance Bond. Joint and Sealant guarantee by Coating applicator and Manufacturer.
 - .3 Horizontal waterproofing: 5 year RCABC waterproofing warranty and detailing; 10 years Manufacturer's material warranty and Performance Bond are required. RoofStar Guarantee Standards for waterproofing are applicable for podiums, plazas / promenades and terraces only. Vehicle parking structures (split slabs), below grade walls, foundations, and repairs or renovations to existing waterproofing systems do not require RoofStar Guarantee coverage. When a 5 year RCABC waterproofing warranty is provided, the Extended Guarantee (1.5.3.2) is not required.
 - .4 Submit the RCABC RoofStar "Roofing Assignment and Guarantee Request" sheet with all roof guarantee certificates at closeout of project.
 - .5 Submit signed certificates to Consultant at closeout of project.
- .4 Commissioning
 - .1 Contractor to repair any defects found in membrane as a result of testing or Electric Field Vector Mapping (EFVM) scan at no cost to the Owner.

2.0 DESIGN AND PERFORMANCE REQUIREMENTS

2.1 Design Requirements

- .1 RCABC warranty standards are required for all waterproofed roofs (inverted), green roofs (inverted), podiums, plazas / promenades and terraces. Vehicle parking structures (split slabs), below grade walls, foundations, and repairs or renovations to existing waterproofing systems do not require a RoofStar Guarantee.
- .2 Membranes under landscaping require access for maintenance and replacement. Pavers or other material that can be removed and re-used for hard landscaping is preferable.
- .3 Membranes are not to be buried under cast-in-place concrete except as absolutely necessary at sidewalks and driveways. A variance request will need to be granted for such instances.
- .4 Per RCABC requirements, electronic leak detection and monitoring is required at all green roofs and waterproofed podiums and plazas and where concrete (split slabs, tile or stone set in a mortar bed etc.) is installed above as noted above.
- .5 For soft landscaping (plants etc.) over membranes use materials that can be removed with light excavation equipment and be disposed of. More valuable plants can be placed in movable planters.
- .6 Membranes, primers or surface-patching materials shall be fully bonded to the surface of the concrete structure to help isolate leak locations.
- .7 Concrete structures under the membrane should be sloped to drains at a minimum of 2%. Account for deflection or other subsidence of the structure when specifying and designing slopes.
- .8 Cold joints at below grade foundation concrete walls should be detailed with vertical reveals to control crack propagation. All below grade foundation walls to be designed with waterstopped crack control joints, located at a minimum of 15'-0" on centre. Spacing to be confirmed with project structural engineer. Architectural details of below-grade construction

- cold joints and control joints should be prepared and to be reviewed by the building envelope consultant.
- .9 Apply membranes only after sustained intervals of dry weather. If construction schedule dictates application during poor weather season, select alternate waterproofing type suitable for poor weather installation. Installation shall strictly follow manufacturer's guidelines for substrate moisture content.
 - .10 Membranes to terminate at least 100 mm higher than the finished grade surfaces of any landscaping. Use termination bars or reglets to finish the top edge of the membrane and install counter flashing to cover and protect membrane above grade. Reglets can be used where aesthetic concerns need to be addressed. All details to meet RCABC requirements.
 - .11 Sills at service doors to be raised 100 mm above finished grade surfaces and be provided by ramps to grade if required to be accessible.
 - .12 Sills at main public access doors and at exit doors must be located flush with exterior walkway pavers. Provide a 3/4" deep recessed pocket immediately beneath the door threshold. Extend the waterproofing membrane into the recessed pocket and upturn at the back and sides of the pocket. Threshold to be set on shims to provide a flush installation with interior finishes and to reduce the risk of any tripping hazard.
 - .13 Exterior pavers shall be installed on pedestals to promote drainage. Pavers are to be provided with adequate spacing or provide trench drains to prevent ponding at or near doorways. Floor finishes on the interior side of these doors should not be moisture-sensitive type products.
 - .14 Door sills to be integrated with terminations of roofing membranes using a liquid waterproofing flashing membrane (PMMA).
 - .15 Subgrade membranes to be drained to perimeter drains via a permeable fill or geotextile system placed on top of the membrane.
 - .16 Starter curb details to be used for all curbs and planter walls on a green roof at roof level.
 - .17 All penetrations for irrigation, electrical or gas services to extend into a roofing jack that terminates into a drained, accessible garden box.
 - .18 All horizontal waterproofing membranes to be covered with protection board.
 - .19 Drain bodies to have clamping ring to receive membrane.

2.2 Performance Requirements

- .1 Materials installed to provide required damproofing and waterproofing shall be:
 - .1 Compatible with adjoining materials.
 - .2 Resistant to deterioration that may reasonably be expected, given the function and exposure of the materials.
- .2 The installation is not to leak at terminations, drains, upturns, or splices.
- .3 The installation is to be impermeable to chloride ions such as from exposure to deicing slats

3.0 MATERIALS

3.1 Product Selection

- .1 UBC-required sub-grade waterproofing system for horizontal surfaces (inverted roofs, podiums, plazas / promenades and terraces):
 - .1 Low-slope applications under soft landscaping: 2-ply torch-applied SBS roofing or hot-applied rubberized asphaltic waterproofing
 - .2 Low-slope application under hard landscaping: 3-ply torch-applied SBS roofing or hot-applied rubberized asphaltic waterproofing
- .2 UBC-required sub-grade waterproofing system for vertical surfaces:
 - .1 Based on results of geotechnical report and occupancy type, the following membrane should be considered as a minimum:
 - .1 Drained and cast in place wall at parkade with no occupied or finished areas only: damproofing with drainage composite protection.

- .2 Drained and cast in place wall: 1-ply torch-applied SBS waterproofing with drainage composite protection.
- .3 Drained and blind side formed wall (cast in place or shotcrete): sheet applied blind side waterproofing with drainage composite.
- .4 Drained and high-risk occupancy: 2-ply torch applied waterproofing or blindside waterproofing with drainage composite for shotcrete foundations.
- .5 Hydrostatic pressure and cast in place wall: 2-ply torch applied waterproofing with protection.
- .6 Elevator Pits – Waterproofing system applicable for green concrete with 10 mil poly protection and drainage composite. Concrete to have crystalline waterproofing additive and waterstops used at cold joints.
- .7 Hydrostatic pressure blind side: Sheet applied blindside waterproofing with protection.
- .8 Hydrostatic pressure shotcrete: 2-ply SBS blindside waterproofing with protection with shotcrete foundations.
- .9 Hydrostatic occupied or high risk: not allowed.

3.2 Acceptable Products

- .1 Damproofing:
 - .1 Damproofing materials, installed to 60mils DFT:
 - .1 Tremco Tremproof 260
 - .2 Epro – E Spray
 - .3 Soprema – Colphene LM Barr
 - .2 Elevator Pit Waterproofing only:
 - .1 Waterproofing materials acceptable for green concrete and installed to 90mils DFT:
 - .1 Tremco Tremproof 250GC
 - .2 Epro – E Spray
 - .3 Soprema – Colphene LM Barr
 - .3 Vertical Waterproofing Materials:
 - .1 Sheet applied blind side waterproofing system:
 - .1 Soprema BSW
 - .2 Epro Pre Tak
 - .3 Grace PrePrufe
 - .2 Torch-applied SBS waterproofing system:
 - .1 Soprema Colphene Torch and Stick
 - .2 Siplast Paradiene 20
 - .3 IKO Torchflex TP 180
 - .3 Blindside waterproofing with shotcrete foundation walls:
 - .1 Soprema BSW
 - .2 Grace PrePrufe
 - .3 Epro PreTak
 - .4 Horizontal (Podium) Waterproofing:
 - .1 Torch-applied SBS roofing membrane:
 - .1 Soprema Flam 180
 - .2 Siplast Paradiene 20 TG
 - .3 IKO Torchflex TP 180
 - .2 Hot-applied rubberized asphaltic waterproofing:

- .1 Hot rubber products to conform to CGSB-37.50-M98, Standard for "Asphalt, Rubberized, Hot Applied, for Roofing and Waterproofing"
- .2 Product to be an approved RCABC waterproofing system.
 - .1 Henry – 790-11 Hot Rubber
 - .2 Hydrotech 6125
 - .3 Soprema Colphene H
- .5 Accessories:
 - .1 Waterstops at joints and penetrations:
 - .1 Swelling waterstops approved with manufacturers waterproofing system.
 - .2 Crystalline slurry at all horizontal concrete shotcrete joints with water stop approved by waterproofing membrane manufacturer.
 - .3 Drainage Composite
 - .1 10mm 2 layer with dimpled core and geotextile
 - .4 Root Barrier:
 - .1 10mils HDPE or 30mils LDPE complete with taped seams
 - .5 Pond Liner:
 - .1 80 mils fully welded HDPE
 - .6 Protection Board:
 - .1 3mm asphalt impregnated cover board
 - .2 10mm drainage composite
- .6 Where specific products are listed and the consultant team would like to propose an equivalent, please provide a variance request clearly noting how the proposed product meets the performance requirements of the approved products/systems.

4.0 **EXECUTION**

- .1 All substrate cracks in concrete substrates to be pre-treated by sawing out crack, installing bridging sealant, and reinforcing waterproofing system over the crack or as per the manufacturer's written instructions.
- .2 Concrete bonding surfaces to be cleaned and prepared by shot-blasting, sand blasting, or water blasting. Remove all laitance, oils, dust, concrete paste and sack all bugholes prior to product installation.
- .3 Review of below-grade application to be completed by the Architect and Building Envelope Consultant prior to backfill. Contractor shall document with photographs prior to backfill or overburden placement.
- .4 Manufacturer's representative to review application on site at the request of the Consultant or UBCV Technical Review Team Architect or UBCO Facilities Management. Site review to be accompanied with written report.

END OF SECTION