

SBS MODIFIED BITUMINOUS ROOFING

1. GENERAL

1.1 System Description

- .1 Concrete Deck: 2 ply SBS modified bituminous sheet roofing work, including but not limited to following:
 - .1 Concrete deck.
 - .2 Vapour barrier.
 - .3 Roof insulation.
 - .4 Tapered insulation
 - .5 Insulation overlayment.
 - .6 Base sheet membrane.
 - .7 Cap sheet membrane.
 - .8 Base and cap sheet flashings.
 - .9 Roof walkways.
 - .10 Firestopping.

1.2 Submittals

- .1 Shop Drawings: Reviewed and signed by manufacturer's technical representative, showing method of installation and layout of each layer, fastening and flashings at edges, flashing of protrusions and penetrations, connection to air barrier in wall, details of insulation, tapered insulation layouts and vapour barrier.
- .2 Maintenance Data: Provide necessary maintenance data and repair instructions, recommendations for periodic inspections, care and maintenance. Identify common causes of damage with instructions for temporary patching until permanent repair can be made.

1.3 Quality Assurance

- .1 Perform Work using skilled and experienced roofing mechanics fully conversant with standards, methods and techniques required for installation of roofing system specified herein. Ensure roofer is qualified and approved by membrane manufacturer.
- .2 Conform to Canadian Roof Contractor's Association (CRCA) Specification Manual as amended to date of this Specification, as applicable, except where indicated or specified otherwise.

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- .3 Pre-installation meeting: Two weeks prior to commencing Work of this Section, arrange for manufacturer's technical representative to visit the Site and review preparatory and installation procedures to be followed, conditions under which the Work will be done, and inspect the surfaces to receive the Work of this Section. Advise the Contract Administrator of the date and time of the meeting.
- .4 Manufacturer's Site inspection: Have the manufacturer's technical representative inspect the Work at suitable intervals during application and at conclusion of the Work of this Section, to ensure the Work is correctly installed. When requested, submit Manufacturer's inspection reports and verification that the Work of this Section is correctly installed.

1.4 Delivery, Storage, and Handling

- .1 Deliver and store materials in dry location, in original containers with Manufacturer's wrappers and seals intact.
- .2 Keep membrane materials dry, stored in rolls standing on end, selvage edge up, elevated from contact with moisture, at temperatures not less than 5°C or more than 49°C. Handle rolls with care to avoid crushing, puncturing or other damage. Ensure selvage edge is not damaged during handling and banding strips are removed before application of membrane. Do not use wet or damp membrane.
- .3 Do not expose insulation and sheathing to wet weather. Store and handle insulation to prevent broken edges and corners, punctures, indentations or other damage. Remove damaged insulation from Site.
- .4 Protect sheet metal materials from bending and scratching.
- .5 Store adhesive, sealants and primers between 15°C and 26°C, or restore to temperature ranges before use.
- .6 Store combustible materials away from heat and open flames.

1.5 Warranty

- .1 Provide membrane Manufacturer's ten year non-prorated material, labour and workmanship warranty, commencing from date of Substantial Performance, covering defects and deficiencies and weathertightness of complete roof and flashing system.

2. PRODUCTS

2.1 Materials - Roof And Flashing

- .1 Roofing and Flashing Base Sheet Membrane: CGSB 37-GP-56M, Type 2, Class C, Grade 1 or 2, minimum 3.0 mm ($\frac{1}{8}$ ") thick, non-woven polyester reinforcement and thermofusible elastomeric asphalt, thermofusible plastic film top and bottom face, applied by torching only,

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Sopralene Flam 180 by Soprema Waterproofing Inc., ModifiedPlus NP180P/P by Bakor Inc., or Torchflex TP-180-FF-Base by IKO Industries Ltd.

- .2 Roofing and Flashing Cap Sheet Membrane: CGSB 37-GP-56M, Type 1, Class A, Grade 2, minimum 3.5 mm (0.138") thick, non-woven 250 g/m² polyester reinforcement and thermofusible elastomeric asphalt, coloured ceramic or mineral granules top face and thermofusible plastic film bottom face, applied by torching only, Sopralene Flam 250Gr by Soprema Waterproofing Inc., ModifiedPlus NP250gT4 by Bakor Inc., or Torchflex TP-250-Cap by IKO Industries Ltd. Standard colour ceramic or mineral granules.
- .3 Parapet and Flashing Base Sheet Membrane: CGSB 37-GP-56M, Type 1, Class A, Grade 2, minimum 2.5 mm (0.098") thick, non-woven 180 g/m² polyester reinforcement and thermofusible plastic film top face and self-adhesive bottom face, Sopralene Flam Stick by Soprema Waterproofing Inc., or IKO Armourbond Flash.
- .4 Roof Walkways: CGSB 37-GP-56M, Type 1, Class A, Grade 2, be minimum 3.5 mm (0.138") thick, non-woven 250 g/m² polyester reinforcement and thermofusible elastomeric asphalt, coloured ceramic or mineral granules top face and thermofusible plastic film bottom face, and be applied by torching only, Sopralene Flam 250Gr by Soprema Waterproofing Inc., or ModifiedPlus NP250gT4 by Bakor Inc., or Torchflex TP-250-Cap by IKO Industries Ltd. Standard colour ceramic or mineral granules.

2.2 Materials - Insulation

- .1 Roof Insulation: CAN/ULC S-701 Type 3, expanded, extruded polystyrene board insulation, ship lapped edges, unfaced, Deckmate Plus by Dow Chemical Canada Inc.
- .2 Tapered Insulation: CAN/ULC S701, Type 2; CFC and HCFC free, unfaced expanded polystyrene insulation, maximum length and width, square edge, taper cut to provide slopes indicated, on computer controlled machine, and sequence packed with detailed installation instruction, or hand-shaven as required, minimum 13 mm(½") thick.
- .3 Insulation Overlayment: 6 mm (¼") thick board, mineral filled asphalt core between glass fiber facers, Re-Cover Board by Bakor, Sopraboard by Soprema or Protectoboard by IKO.
- .4 Insulation adhesive: As recommended by insulation manufacturer.

2.3 Materials – Metal Flashing

- .1 Sheet Metal: Minimum 0.49 mm (26 ga) overall thickness, galvanized to ASTM A653 Z275 zinc coating, commercial quality sheet, stretcher levelled or temper rolled to stretcher level standard of flatness. Prepaint Work in Baycoat Metallic series, colour to match metal cladding.
- .2 Aluminium Flashing And Trim Sheet Metal: Prefinished aluminium, 0.8 mm base metal thickness, colour to match aluminium panels.

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- .3 Cleats and Starter Strips: Same as specified sheet metal, unless indicated otherwise, make cleats at least 38 mm (1 ½") wide and interlocked with metal flashing.
- .4 Flashing Fasteners: CSA B111 Table 12, finished to match metal being fastened where exposed to view. Size and type to suit requirements.
- .5 Sealant: CAN/CGSB-19.13-M, Class M-2-25-B-N, one component polyurethane, or manufacturer's approved products.

2.4 Materials - Accessories

- .1 Asphalt primer: CGSB 37-GP-9Ma or as approved by manufacturer.
- .2 Asphalt: CSA A123.4-M; Type 2 or Type 3.
- .3 Vapour Retarder: CSA A123.3-M, No. 15 perforated, organic type felt.
- .4 Precast Pavers: CSA A231.2, precast concrete pavers, smooth faced 600 mm x 600 mm x 45 mm (24" x 24" x 1 ¾") thick of steam cured 30 MPa concrete with between 4% and 6% entrained air, with edges chamfered.
- .5 Pedestals: Black plastic mouldings, complete with spacers, sized to suit pavers.
- .6 Fire-proofing: as approved by contract administrator.

3. EXECUTION

3.1 Inspection

- .1 Report any defects or irregularities in roof deck detrimental to roof application. Do not proceed until corrected.
- .2 Allow concrete deck to cure for minimum thirty (30) days before placement of any roofing materials.
- .3 Check deck is properly installed in compliance with latest CRCA recommendations and specifications, with required slopes to attain positive drainage and drains are connected.
- .4 Ensure openings, walls and projections through deck are completed and affixed and reglets and nailing strips are in place prior to membrane installation. Cooperate with mechanical and/or electrical divisions as necessary.
- .5 Ensure deck substrate scheduled to receive roof system is smooth, dry, clean and free of sharp projections.

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3.2 Preparation

- .1 Sweep roof surfaces clean, remove debris, water, dew, frost, snow, ice and foreign materials (oil/grease) which could impair work.
- .2 Do not use salt or calcium to remove ice or snow.
- .3 Do no roofing work during rain, fog, sleet or snow, or upon surfaces covered with dust, water, dew, ice, frost, snow and similar detrimental conditions.
- .4 Apply approved fire-stopping to all joints to ensure a tight seal and prevent debris and material from dropping through gaps between concrete roof structure members.

3.3 Protection

- .1 Protect adjacent work, building and property, existing and completed portion of roof, from damage during roofing operations, including interior of building.
- .2 Hang tarpaulins to protect walls where hoisting is necessary. Locate kettles so smoke will not discolour building or adjacent buildings or enter air intakes. Keep masonry and finished surfaces clean and free of bitumen.
- .3 Use wood planks or minimum 9 mm ($\frac{3}{8}$ ") thick plywood sheathing in work areas and along work routes as required to prevent damage to steel deck, or sheathing and roofing.
- .4 Keep two foam or dry type fire extinguishers on roof within easy access of torching application and in any open flame location while roofing is in progress.
- .5 Verify no vent pipes venting flammable fumes (i.e. fuel storage tanks) are located in area of work.
- .6 Do not have gasoline or other flammable solvents on roof while torching.
- .7 Install temporary blocking and/or otherwise protect drains during roofing operations. Remove at completion of roofing work.
- .8 At conclusion of each day's Work, seal exposed edges of roof insulation. Remove when resuming Work.
- .9 Ensure all debris and material is properly and fully cleaned from interior of building should it fall between the gaps in the concrete roof structure members. Any such instances should not damage any areas of the building or equipment or restrict other trades from continuing Work inside the building.
- .10 Do not torch over or near flammable substrates such as fibreboard.

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3.4 Cold Weather Application

- .1 Remove moisture from substrate before application of membrane.
- .2 Daily weather forecasts shall be followed to determine commencement of Work or to anticipate possible suspension.
- .3 At temperatures below 10°C, store membrane material in warm and dry storage until ready to use. Bring out to work area only enough rolls for immediate use.
- .4 Unroll membrane and allow roll to relax in sunlight for 30 to 45 minutes before application. Re-roll from both ends and apply in both directions.
- .5 Maintain mopping temperatures of asphalt at minimum 204°C. Limit mop strokes to 1200 mm (48") ahead of roll.
- .6 Before starting mop stroke, pull roll tightly against cooled asphalt, so as to eliminate any air pockets or voids that may have occurred during previous mop stroke.

3.5 Installation

- .1 General: Use only roofing equipment approved by manufacturer of roofing membrane system.

3.6 Installation - Primer

- .1 Prime concrete deck with asphalt primer in manner approved by primer manufacturer, at minimum rate of 0.50 l/m² (1 gal/300 ft²).
- .2 Apply primer to surfaces to which membrane or vapour barrier shall be adhered to directly. Allow primer to cure. Do not allow ponding.

3.7 Bitumen

- .1 Heat asphalt in accordance with manufacturer's directions. Never heat asphalt to or above Flash Point (FP) indicated by manufacturer, but in any case do not heat asphalt to or above 260°C.
- .2 Do not apply at temperature lower than EVT (Equiviscous Temperature). Restrain asphalt temperature at point of application to EVT plus/minus 15°C.
- .3 Do not heat and hold asphalt above Finish Blowing Temperature (FBT) for more than 4 hours.
- .4 Use heating kettles equipped with thermometers which continually show temperature of asphalt. Equip foreman with portable stem thermometer for checking temperature at point of application.

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- .5 Roofing Asphalt: Type 2 for slopes up to 1:16 and Type 3 for slopes greater than 1:16.

3.8 Vapour Retarder

- .1 General: Install vapour retarder full coverage and continuously, overlapped and sealed to adjacent air/vapour barrier at top of parapets and curbs to ensure continuity of building envelope.
- .2 Mop prime deck with uniform and continuous coating of asphalt. Roll felt in hot mopped asphalt, lapping each sheet 480 mm (19") over preceding sheet and mopping full 480 mm (19") under each lap leaving no area unmopped. Use 1.2 kg/m² (25 lb/sq) of asphalt per ply. Seal lap joints.

3.9 Installation - Insulation

- .1 Before laying any insulation, inspect vapour barrier and repair damage, if any. Ensure surface is free of wrinkles, air pockets, fishmouths or tears.
- .2 Over vapour barrier apply full mopping of asphalt at minimum rate of 1.0 kg/m² (20 lb/sq) and embed insulation.
- .3 Lay roof insulation in hot asphalt. Bring each board into moderate contact with adjacent boards and do not force into place.
- .4 Cover entire area of base insulation with tapered insulation. Lay in accordance with manufacturer of tapered insulation's shop drawings, with joints staggered from insulation joints. Lay each layer in full mopping of hot asphalt. Tape joints in top layer of insulation.
- .5 Cover entire area of tapered insulation with overlayment. Stagger joints of lower overlayment to those of tapered insulation. Stagger joints upper overlayment to those of lower overlayment. Lay work in full mopping of asphalt.
- .6 Where insulation and overlayment abut irregular surface, scribe to profile thereof, elsewhere cut insulation square and neatly to provide plain butt joints at perimeter of insulation, at curbs and other vertical objects and surfaces.
- .7 Lay only as much roof insulation and overlayment that can be covered on same day with roofing membrane. At conclusion of day's Work, seal exposed edges. Upon resumption of Work, cut and remove sealed edges, square, neat and straight.
- .8 Reduce thickness of insulation at drains by 13 mm (½") for 1200 mm (48") square centred on each drain to ensure free flow to drain.
- .9 Keep insulation, tapered insulation and insulation overlay dry at all times.

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3.10 Base Sheet Membrane

- .1 Ensure membrane substrate is rigid, dry, smooth, compatible, free of fins and sharp edges, and clean of debris and foreign matter and no moisture is present on substrate at time of application of membrane.
- .2 Start roofing application at lowest point of roof (edge or drain) to ensure water flows over laps of membrane. Proceed up slope at right angles to direction of flow.
- .3 Position and unroll membrane to achieve correct overlap and alignment with roof line. Re-roll one end minimum 3000 mm (10') and adhere to substrate. Complete application of remainder of sheet.
- .4 Torch weld base sheet membrane by sufficiently heating lower surface of membrane evenly across width of roll to melt lower surface and provide flow of bitumen. At same time unroll roofing membrane into melted bitumen. Keep checking adhesion to be certain asphalt is hot enough. Take care and inspect so heating is even across width to avoid skips or voids.
- .5 Lay base sheet with 75 mm (3") side laps and 150 mm (6") end laps.
- .6 Flow out bead shall be present at all locations along lap edges. Avoid excessive asphalt seepage. Maximum seepage allowed 6 mm (¼").
- .7 At walls and vertical surfaces, extend membrane minimum 50 mm (2") on vertical surface and nailed at 300 mm (12") on centres.

3.11 Base Sheet Flashings

- .1 Apply base sheet flashing over dried and cured primer coat.
- .2 Pre-cut flashing in strips 1 m (39") wide to correct length to extend minimum 100 mm (4") onto field of roof, up vertical surface and over any fascia minimum 50 mm (2"). Side laps shall be 75 mm (3") and staggered minimum of 100 mm (4") with laps of base sheet. Dry fit pieces to proper size.
- .3 Provide base flashing reinforcements at stress points of roof, at inside and outside corners, vents, drains and mechanical units. Install as detailed on Drawings or follow membrane manufacturer's recommendations.
- .4 Provide base flashings at roof protrusions such as vents pipes, roof drains, mechanical equipment curbs. Install as detailed on Drawings.
- .5 Torch apply base sheet flashing directly on its support from bottom to top. Torch welding shall soften under side of base sheet without overheating, resulting in uniform adhesion over entire surface. Take precaution not to stretch membrane. When allowed by support, nail top edge of base sheet flashing 300 mm (12") oc.

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3.12 Cap Sheet Membrane

- .1 Do not apply cap sheet until base sheet and flashing have been applied and show no sign of defects.
- .2 Plan cap sheet application so side and end laps are offset from those of base sheet minimum 300 mm (12") for side and 450 mm (18") for end laps. Mark chalk line, centred on base sheets, where first course is to start. Unroll 2 m to 3 m (6' to 9') of membrane and line it up to chalk lines or to selvage edge. If roll goes out of line by more than 13 mm (½"), cut and re-align. Re-roll from both ends and apply in both directions.
- .3 Lay cap sheet with 75 mm (3") side laps to cover selvage edge and 150 mm (6") end laps.
- .4 Commence application of cap sheet with 1 m (39") square of cap sheet centred on each drain and torched down.
- .5 Apply one ply of cap sheet granule side up. Position and unroll cap sheet to achieve correct overlap and alignment. Re-roll one end minimum 3000 mm (10') and adhere to substrate. Complete application of remainder of sheet. Torch weld by sufficiently heating lower surface of membrane evenly across width of roll to melt lower surface and provide flow of bitumen. At same time unroll roofing membrane into melted bitumen. Keep checking adhesion to be certain asphalt is hot enough. Take care and inspect so heating is even across width to avoid skips or voids. Install cap sheet in same direction as base sheet.
- .6 Flow out bead shall be present at all locations along lap edges. Avoid excessive asphalt seepage. Maximum seepage allowed 6 mm (¼").
- .7 Take great care to ensure asphalt does not spread out over exposed part of cap sheet.
- .8 Factory provided granules shall be applied to overflow bitumen at lap before bitumen cools to provide clean appearance.
- .9 Bevel "T" joints at end or head laps and repair fishmouths using torch heated trowel.
- .10 Cut out drain opening after drain clamps have been installed.

3.13 Cap Sheet Flashings

- .1 Pre-cut flashing in strips 1 m (39") wide to correct length to extend minimum 150 mm (6") onto field of roof, up vertical surface and over any fascia minimum 50 mm (2"). Side laps shall be 75 mm (3") and staggered minimum of 100 mm (4") with laps of base sheet. Dry fit pieces to proper size.
- .2 Using chalk line, lay out straight line on cap sheet surface, parallel to roof edge, 150 mm (6") inside roof from parapet wall.

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- .3 Soften bitumen by heating mineral surface with torch. When granules start to sink into bitumen, stop torching with hot round nosed trowel, embed granules in bitumen from chalk line to edge of cap sheet.
- .4 Torch apply cap sheet completely covering base sheet, lapping edges to selvage. Torch welding shall soften under side of base sheet without overheating, resulting in uniform adhesion over entire surface. Press in firmly for proper adhesion. Continue by bonding upper portion to wall, taking precautions not to stretch membrane.
- .5 Anchor, with tin capped nails or roofing nails and disks or membrane manufacturer's recommended fasteners placed at top of flashing and driven into wood backing.
- .6 Flow out bead shall be present at all locations along lap edges. Avoid excessive asphalt seepage. Maximum seepage allowed 6 mm (1/4").
- .7 Take great care to ensure asphalt does not spread out over exposed part of cap sheet flashing.
- .8 Factory provided granules shall be applied to overflow bitumen at lap before bitumen cools to provide clean appearance.

3.14 Sheet Metal Work

- .1 Do not install metal flashings until membrane flashings have been reviewed by Contract Administrator.
- .2 Take delivery of pre-painted flashings supplied by others.
- .3 Prime metal flashings with asphalt primer.
- .4 Double back exposed edges at least 13 mm (1/2") for appearance and stiffness.
- .5 Provide continuous starter strips to present true, leading edge. Anchor to backup to provide rigid, secure installation. Conceal fastening.
- .6 Counterflash modified bitumen flashings as indicated. Dovetail, mitre corners.
- .7 Use slip expansion seams. Make joints to permit thermal movement. Make surfaces free from buckling, warp, wave, dents, oil canning or other defects. Make corners square and surfaces straight and in true planes. Equally space joints in any one run of flashing to suit building module or window spacing and in all cases locate in consultation with Contract Administrator before installation commences. Space seams 2400 mm (8') or maximum or closer if indicated.
- .8 Obtain Contract Administrator's approval of exposed fastenings. If exposed screws or bolts are used, use lead or neoprene washers with them.
- .9 Close lock seams gently with wood block and mallet, apply sealant to joints.

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3.15 Roof Walkways

- .1 Remove loosely embedded granules from cap sheet in areas to receive walkways. Prime cap sheet area to which roof walkways will be applied.
- .2 Apply walkways in 900 mm x 900 mm (36" x 36") sections spaced 25 mm (1") apart to prevent ponding of water. Ensure walkways do not hinder drainage patterns of roofing system.
- .3 Torch apply walkways membrane to roof cap sheet. Sufficient heat should be applied to melt lower surface of roof walkways membrane and provide flow of bitumen. At same time unroll membrane into melted bitumen. Ensure flow out bead is present at all locations along lap edges. Maximum seepage allowed 6 mm (¼").
- .4 At roof perimeters and/or where indicated on Drawings, place precast concrete pavers spaced 13 mm (½") apart on pedestals. Shim pavers level using pedestal Manufacturer's shimming system.

3.16 Expansion Joints

- .1 Expansion Joints: Construct expansion joints within roof construction in locations indicated on Drawings.

3.17 Field Quality Control

- .1 Inspection: City may engage independent inspection company to inspect Work of this Section. Give at least two (2) weeks notice of starting Work and allow inspector free access. Inspection may include thermographic survey of completed roof.

END OF SECTION