

# SECTION 07 51 13

## MODIFIED BITUMEN MEMBRANE

SPEC NOTE: This Guide Specification includes materials and installation procedures for 4 plies of Type IV or Type VI glass ply sheets in combination with 2-ply SBS modified bitumen membrane flashing system using SEBS 890-12 modified mopping asphalt applied over conventional insulated deck with air vapour barrier membrane in accordance with the requirements of the NBC for the building envelope. This specification is ideally suited for premium performance roofing systems typical of Hospitals, Schools and commercial projects. This specification should be adapted to suit the requirements of individual projects. It is prepared in CSC three part format and should be included as a separate section under Division 7 - Thermal and Moisture Protection.

### PART 1: GENERAL

#### 1.1 General Requirements

- .1 The General Conditions, the Supplementary Conditions, the Instructions to Bidders and Division One General Requirements shall be read in conjunction with and govern this section.
- .2 The Specification shall be read as a whole by all parties concerned. Each Section may contain more or less than the complete work of any trade. The Contractor is solely responsible to make clear to the Subcontractors the extent of their work.

#### 1.2 Description

- .1 Supply labour, materials, plant, tools and equipment to complete the Work as shown on the Drawings and as specified herein including, but not limited to the following:
  - .1 Roof Deck (by others),
  - .2 Primer & Air Vapour Barrier Membrane,
  - .3 Roof Insulation & Tapered Insulation,
  - .4 Overlay Fibre Board,
  - .5 4 plies Type IV [VI] Glass Sheets with Flood Coat & Gravel,
  - .6 Base Sheet & Cap Sheet Flashing,
  - .7 Metal Flashings and Accessories.

#### 1.3 Related Work

- .1 Concrete: Section [XXXXX]
- .2 Rough Carpentry: Section [XXXXX]
- .3 Metal Flashing and Trim: Section [XXXXX]
- .4 Sealants: Section [XXXXX]
- .5 Roof Vents & Drains: Section [XXXXX]

#### 1.4 References

- .1 CSA A123.4-[M1979]: Bitumen for use in Construction of Built-Up Roof Coverings and Dampproofing and Waterproofing systems.
- .2 CAN/CSA-A247-[M86]: Insulating Fibreboard.
- .3 CSA 0121-[M1978]: Douglas Fir Plywood.
- .4 CAN/CGSB-37.9-[83]: Primer, Asphalt, Unfilled for Asphalt Roofing, Dampproofing and Waterproofing.
- .5 CAN/ULC-S704-01: Standard Specification for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
- .6 CAN/ULC-S770-00: Standard Test Method for Determination of Long Term Thermal Resistance (LTTR) of Closed Cell Thermal Insulating Foams
- .7 CAN/CGSB-37.29-[M89]: Rubber-Asphalt Sealing Compound.
- .8 CGSB 37-GP-56M-[80]: Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

#### 1.5 Shop Drawings

- .1 Submit shop drawings in accordance with Section [XXXXX] - [XXXXX].
- .2 Provide complete layout for tapered insulation system.

#### 1.6 Storage and Handling

- .1 Store *modified* **PLUS**<sup>®</sup> membranes and accessories in a dry location, in original containers.
- .2 If product is stored outside, it must be elevated on a platform and be protected with a waterproof cover, which will shed water away from the material.
- .3 Store all products in an upright position. Do not double stack unless product is on pallets and packaged as received from factory. Never stack more than two pallets high without racking.

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- .4 In cold weather store *modifiedPLUS*<sup>®</sup> membranes in heated area and take onto roof immediately prior to use.
- .5 Store adhesives and primers between 15 degrees C (60 degrees F) and 26 degrees C (80 degrees F), or restore to temperature range before use.
- .6 Store combustible materials away from heat and open flame.
- .7 Do not store *modifiedPLUS*<sup>®</sup> membranes at ambient temperatures above 49 degrees C (120 degrees F).

#### 1.7 Environmental Requirements

- .1 *modifiedPLUS*<sup>®</sup> installations in temperatures below 4 degrees C (40 degrees F) can result in quality concerns.
- .2 Verify adhesion regularly during cold temperature applications.
- .3 Store rolls in heated location until needed on the roof.
- .4 It is recommended that when temperatures remain below -10 degrees C (4 degrees F) for mopping applications and below -18 degrees C (0 degrees F) for thermofusible applications operations should be suspended.
- .5 Minimum working temperatures shall take into consideration a factor for wind chill. Application temperature shall be considered to be the temperature minus half of the wind speed as recommended by the Canadian Roofing Contractors Association (CRCA).

#### 1.8 Protection

- .1 Maintain fire watch for one hour following each day's work when membranes are thermofused.
- .2 Maintain one fully operational fire extinguisher per torch applicator within 10 m of point of work.
- .3 Protect membrane from site damage during application. Cover traffic areas with appropriate protection to serve as walkways so as to prevent any damage to the membrane.

#### 1.9 Submittals

- .1 Submit in writing, a document stating that the applicator of the primary membranes specified in this Section are recognized by the manufacturer as suitable for the execution of the Work.
- .2 Prior to commencing the Work submit copies of manufacturers' current ISO certification. Membrane, primers, sealants, adhesives and associated auxiliary materials shall be included.
- .3 Prior to commencing the Work submit references clearly indicating that the membrane manufacturer has successfully completed projects on an annual basis of similar scope and nature for a minimum of fifteen years. Submit references for a minimum of ten projects.
- .4 Prior to commencing the Work submit manufacturers' complete set of standard details for the air/vapour barrier and roofing membrane systems showing a continuous plane of air tightness throughout the building envelope.

#### 1.10 Quality Assurance

- .1 Perform Work in accordance with the printed requirements of the membrane manufacturer and this specification. Advise designer of any discrepancies prior to commencement of the Work.
- .2 Maintain one copy of manufacturers literature on site throughout the execution of the Work.
- .3 At the beginning of the Work and at all times during the execution of the Work, allow access to site by the roofing membrane manufacturers representative.
- .4 At the request of the [architect] [engineer] [consultant], submit documentation certifying that the roofing membranes comply with CGSB 37-GP-56M.
- .5 Materials used in this Section, including air/vapour barrier membranes, roofing membranes, primers, mastics, adhesives and sealants shall be fully compatible and shall be sourced from one manufacturer.
- .6 At the request of the [architect] [engineer] [consultant], submit copies of the membrane manufacturers current certification to ISO 9000.

#### 1.11 Alternates

- .1 Submit requests for alternates in accordance with Section [XXXXXX] - [XXXXXX].
- .2 Alternate submission format to include:
  - .1 Submit evidence that alternate materials meet or exceed performance characteristics of Product requirements and documentation from an approved independent testing laboratory certifying that the performance of the roofing membrane system including air vapour barrier and transition sheets, exceed the requirements of the National Building Code.
  - .2 Submit copies of manufacturers' current ISO certification.
  - .3 Submit references clearly indicating that the membrane manufacturer has successfully

- completed projects on an annual basis of similar scope and nature for a minimum of five years.
- .4 Submit manufacturers' complete set of standard details for the roofing membrane systems showing a continuous plane of air tightness throughout the building envelope.
- .3 Submit requests for alternates to this specification a minimum of fifteen (15) working days prior to tender closing for evaluation. Include a list of 10 projects executed over the past five years.
- .4 Acceptable alternates will be confirmed by addendum. Substitute materials not approved in writing prior to tender closing shall not be permitted for use on this project.

#### 1.12 Warranty

- .1 For the Work of this Section, the 12 months warranty period prescribed in subsection GC 32.1 of General Conditions "C" is extended to [24 months] [60 months].
- .2 Contractor hereby warrants the modified bituminous roofing and membrane flashings for leak coverage in [accordance with GC24], but for two years.
- .3 Roofing membrane manufacturer hereby warrants the membrane and membrane flashings for leak coverage as a result of faulty materials for a period of [five years] [ten years]. Scope of warranty shall include material required to return the membrane to a watertight condition.
- .4 Roofing membrane manufacturer hereby warrants the membrane and membrane flashings for leak coverage as a result of faulty materials or faulty workmanship for a period of ten [10] years. Scope of warranty shall include material and labour required to return the membrane to a watertight condition.

## **PART 2: PRODUCTS**

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- 2.1 Components and membrane materials must be obtained as a single-source from the membrane manufacturer to ensure total system compatibility and integrity.
- 2.2 Roofing Membrane Manufacturer: **Henry Canada,**  
15 Wallsend Drive  
Scarborough, ON M1E 3X6  
Tel: 1-800-523-0298  
Fax: 1-866-223-1285  
Web Site: [www.bakor.com](http://www.bakor.com)
- 2.3 .1 Gypsum board shall be minimum 12.7 mm (1/2") thick, 1200 mm x 2400 mm (4' x 8') sheets; conforming to CSA A82.27-M standard.
- .2 Gypsum Board Adhesive shall be 830-05 Fire Resistive Roof and Insulation Adhesive manufactured by Bakor.
- .3 Gypsum board fasteners shall be No. 10 flat countersunk head self-tapping screws, Type [A,AB], Phillips head, [cadmium plated] [19, 25 mm] [3/4", 1"] long, to CSA B35.3.
- 2.4 Primers
  - .1 Primer for all hot asphalt applied membranes shall be 910-01 manufactured by Bakor Inc. and be fully compatible with membranes.
  - .2 Primer for all thermofused applications shall be 930-18 Poly-Tac™ rubberized primer manufactured by Bakor and be fully compatible with membranes.
  - .3 Primer for all self-adhered base sheet flashings shall be 930-38 or 900-34 manufactured by Bakor and be fully compatible with membranes.
  - .4 Primer for all self-adhered transition air/vapour barrier membranes shall be Blueskin® Primer manufactured by Bakor and be fully compatible with membranes.
- 2.5 Air/Vapour Barrier Membranes
  - .1 Transition tape (Self-Adhered) shall be Blueskin SA Self-Adhesive Tape manufactured by Bakor, an SBS modified bitumen self-adhering membrane reinforced with non-woven fibrous glass and having a minimum thickness of 1.0 mm (40 mils), used over joints and penetrations of the substrate to reduce the risks during hot applications.
  - .2 Air/vapour barrier (Set In Hot Asphalt) shall be *modified***PLUS**® G100s/s manufactured by Bakor, an SBS modified bituminous membrane with a 100 g/m<sup>2</sup> glass reinforcement and have a sanded surface top and bottom with a minimum thickness of 2.0mm (80 mils). Product shall conform to the requirements of CGSB 37-GP-56M Type 2 Class C Grade 1.
  - .3 Air/vapour barrier (Thermofused) shall be *modified***PLUS**® G100p/p manufactured by Bakor, an SBS

modified bituminous membrane with a 100 g/m<sup>2</sup> glass reinforcement and have a polyethylene surface top and bottom with a thickness of 2.2mm (88 mils). Product shall conform to the requirements of CGSB 37-GP-56M Type 2 Class C Grade 1.

- .4 Air/vapour barrier (Self-Adhered) shall be Eaveguard manufactured by Bakor, an SBS modified bitumen self-adhering glass reinforced membrane having a thickness of 1.5 mm (60 mils).
- .5 Kraft/asphalt vapour retarder shall be a Kraft Paper laminated with asphalt. The edges shall be reinforced with strands of yarn. Product shall be ULC listed and meet the requirements of CAN/CGSB-51.33 Type II. Product shall be adhered using Vapour-Bloc<sup>®</sup> Adhesive manufactured by Bakor, to meet the requirements of ULC.

## 2.6 Mopping Asphalts

- .1 Mopping asphalt shall be CSA A 123.4 M Type 2 for slopes up to 1:16 and Type 3 for slopes 1:16 to 3:12. Use Type 3 for all flashings.
- .2 Modified mopping asphalt shall be [SEBS 890-12], [SEBS 890-12 LT], [SEBS 890-12LT2] asphalt manufactured by Bakor, a rubberized SEBS kettle modified type designed for application in standard roofing equipment.

## 2.7 Roof Insulation

- .1 Extruded polystyrene to CAN/CGSB-51.20M, [ASTM C578-85-Type IV], Type [2] [4], to thickness indicated. Maximum dimension when hot mopping shall be 1219 mm (4 feet).
- .2 Fibrous glass [mineral wool] to CAN/CGSB-51.31, [FS HH-1-526/ASTM C726] to thickness indicated.
- .3 Polyisocyanurate to CAN/CGSB-51.26M, [FS-HH-1-1972/Gen.] [faced, type 1,2,3,4] to thickness indicated. Maximum dimension when hot mopping shall be 1219 mm (4 feet).
- .4 Expanded polystyrene to CAN/CGSB-51.20M [FS-HH-1-524C/ASTM C578] to thickness indicated. Maximum dimension when hot mopping shall be 1219 mm (4 feet).

## 2.8 Tapered Roof Insulation as fabricated with a minimum thickness of 25 mm (1/2 inch) and minimum slope of 1:50 (2%).

- .1 Wood fibreboard conforming to CAN/CSA-A247-M86 and shall have a minimum thickness of [11 mm (7/16 inch)] [25mm (1 inch)].
- .2 Overlay: Overlay shall be Re-Cover Board manufactured by Bakor. Minimum thickness shall be 3 mm (1/8 inch). Use appropriate surfacing depending on base sheet application method.

## 2.10 Wood cants strips with sloped side to measure 140 mm in width. Wood cant strips to be dry and true before use. Cant strips of wood fibre shall be cut from 38 mm-thick wood fibre, sloped side to measure 140 mm in width.

## 2.11 4 Ply Roof Membrane Mop Applied

- .1 Standard Duty shall be four plies of Type IV glass felt meeting ASTM D 2178.
- .2 Heavy Duty shall be four plies of Type VI glass felt meeting ASTM D 2178.

## 2.12 Mop Applied Base Sheets and Cap Sheet Flashings

- .1 Base sheet flashings (Standard Duty) shall be *modifiedPLUS*<sup>®</sup> G100s/s manufactured by Bakor, an SBS modified bitumen membrane having a minimum thickness of 2.0 mm (80 mils) and a glass reinforcement of 100 g/m<sup>2</sup> meeting CGSB 37-GP-56M Type 2 Class C Grade 1. The upper and lower surface shall be sanded.
- .2 Base sheet flashings (Heavy Duty) shall be *modifiedPLUS*<sup>®</sup> NP180s/s manufactured by Bakor, an SBS modified bitumen membrane having a minimum thickness of 2.2 mm (90 mils) and a non-woven polyester reinforcement of 180 g/m<sup>2</sup> meeting CGSB 37-GP-56M Type 2 Class C Grade 2. The upper and lower surface shall be sanded.
- .3 Cap sheet flashing (Standard Duty) shall be *modifiedPLUS*<sup>®</sup> NP180gM [FR] manufactured by Bakor, an SBS modified bitumen membrane having a minimum thickness of 4.0mm (160 mils) and a non-woven polyester reinforcement of 180 g/m<sup>2</sup> meeting CGSB 37-GP-56M Type 1 Class A Grade 2. The upper surface shall have ceramic granules and the lower surface shall be sanded.
- .4 Cap sheet flashing (Heavy Duty) shall be *modifiedPLUS*<sup>®</sup> NP250gM4 manufactured by Bakor, an SBS modified bitumen membrane having a minimum thickness of 4.0 mm (160 mils) and a non-woven polyester reinforcement of 250 g/m<sup>2</sup> meeting CGSB 37-GP-56M Type 1 Class A Grade 2. The upper surface shall have ceramic granules and the lower surface shall be sanded.

## 2.13 Mop applied expansion joint membrane shall be *modifiedPLUS*<sup>®</sup> NP180p/s manufactured by Bakor, an SBS modified bitumen membrane having a minimum thickness of 2.2 mm (100 mils) and a non-woven polyester reinforcement of 180 g/m<sup>2</sup> meeting CGSB 37-GP-56M Type 2 Class C Grade 2. The upper surface shall have a polyethylene film and the lower surface shall be sanded.

- 2.14 Membrane sealant in compliance with CAN/CGSB 37.29, shall be POLYBITUME® 570-05 Polymer Modified Sealing Compound manufactured by Bakor.
- 2.15 Plastic Roof Cement in accordance with of CAN/CGSB-37.5. shall be Bakor 810-21 Wet/Dry Plastic Roof Cement.
- 2.16 Pitch Pocket Mastic shall be Thermostic® 840-10 Internal Setting Roof Adhesive, a non-shrink 100% solids pourable mastic in conjunction with Blueskin® Primer Ultra manufactured by Bakor.
- 2.17 Gravel Surfacing: Washed pea gravel ranging in size from 5 mm to 20 mm.

### **PART 3: EXECUTION**

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- 3.1 Examination: Verify that all deck surfaces and substrates are acceptable for installation of the system.
- 3.2 Roof Underlay Board
  - .1 Install roof underlay board over metal where required by NBC for thermal barrier protection.
  - .2 Apply a continuous coat of adhesive to steel deck in accordance with manufacturers requirements and lay underlay board into wet adhesive.
  - .3 Install only full pieces of underlay board, cut and fit boards to butt tight as recommended by manufacturer. Stagger and offset board joints.
  - .4 Apply thermal barrier using mechanical fasteners in accordance with manufacturers written instructions.
- 3.3 Substrate Joint Treatment for Hot Applications
  - .1 Apply primer by roller or spray to all surfaces to be covered with self-adhered transition tape as required and allow to dry.
  - .2 Unroll and align transition membrane centered at low point of roof or drain. Apply transition membrane by removing release paper providing 50 mm (2 inches) side and end laps.
- 3.4 Mop Applied Air/Vapour Barrier
  - .1 Apply primer by roller or spray to all surfaces to be covered with air/vapour barrier membrane, applied at a rate of 2 to 6 m<sup>2</sup>/l (100-300 ft<sup>2</sup>/Imp.gal.) and allow to dry.
  - .2 Unroll and align air/vapour barrier centered at low point of roof or drain. Apply air/vapour membrane in Type 2 asphalt applied at a rate of 1.25 kg/m<sup>2</sup> (25 lbs/100ft<sup>2</sup>), lapping 75 mm (3 inches) on sides and 150 mm (6 inches) on ends. A bead of asphalt should be observed flowing out of the seams. Seal around projections as per manufacturers recommendations.
  - .3 Coordinate application of roof air/vapour barrier with wall air/vapour barrier to ensure continuity.
- 3.5 Thermofused Air/Vapour Barrier
  - .1 Apply primer by roller or spray to all surfaces where air/vapour barrier membrane is to be applied at a rate of 4 to 6 m<sup>2</sup>/l (200-300 ft<sup>2</sup>/Imp.gal.) and allow to dry.
  - .2 Unroll and align air/vapour barrier centered at low point of roof or drain. Re-roll and torch applying even heat across width of roll. Sufficient heat should be applied to melt the lower surface and provide a flow of bitumen. Lap sheet 75 mm (3 inches) on sides and 150 mm (6 inches) on ends. At all end or head laps where T joint occurs, cut corner of membrane to be overlapped on a 45 degree angle. Ensure membrane is free of wrinkles or blisters and is well adhered to the substrate.
  - .3 Scorch top polyfilm over entire surface prior to installing insulation with hot asphalt or cold adhesives.
  - .4 Coordinate application of roof air/vapour barrier with wall air/vapour barrier to ensure continuity.
- 3.6 Self-Adhered Air/Vapour Barriers
  - .1 Apply primer by roller or spray to all surfaces to be covered with self-adhered transition tape as required and allow to dry.
  - .2 Unroll and align transition membrane centered at low point of roof or drain. Apply transition membrane by removing release paper providing 50 mm (2 inches) side and end laps.
  - .3 Apply membrane complete and continuous to prepared and primed substrate in an overlapping shingle fashion and in accordance with manufacturer's written instructions. Stagger all vertical joints. Unroll and align air/vapour barrier centered at edge or low point of roof.
  - .4 Align and position membrane, remove protective film and press firmly into place. Ensure minimum 50 mm (2 inches) overlap at all end and side laps. Promptly roll all laps and membrane with a counter top roller to effect the seal.

- 3.7 Insulation and Overlay Fibre Board
- .1 Install insulation in moderate contact, stagger end joints to provide a smooth surface for application of membrane.
  - .2 Embed insulation in hot asphalt applied at the rate of 1.5 kg/m<sup>2</sup> (30 lbs. per 100 ft<sup>2</sup>) or as per insulation manufacturers instructions.
  - .3 Install only as much insulation as can be covered by roofing membrane in the same day.
  - .4 Install tapered insulation and fibre board in hot asphalt applied at a rate of 1.25 kg/m<sup>2</sup> (25 lbs/100ft<sup>2</sup>) as per manufacturers recommendations. Install only as much tapered insulation and fibre board as can be covered by roofing membrane in same day. Follow manufacturers' written instructions.
  - .5 Install cant strips in adhesive as detailed.
- 3.8 Roof Membrane
- .1 Starting at the low point, at right angles to the slope embed 4 plies of Type IV [Type VI] Ply Sheet in to [SEBS 890-12], [SEBS 890-12 LT], [SEBS 890-12LT2] hot asphalt applied at a rate of 1.25 kg/m<sup>2</sup> (25 lbs/100ft<sup>2</sup>). Mopping asphalt shall be heated so that its mopping temperature is not below 204 degrees C (400 degrees F). Nailing strips must be provided on slopes greater than 1:12. Apply ply sheet in shingle fashion.
  - .2 Start all roofing applications at the lowest point to ensure water runs over the laps of the membrane.
  - .3 Unroll membrane into mopped asphalt a maximum of 1.2 m (4 feet) behind mopping application and carry to top of cant.
  - .4 Lap base sheet 75 mm (3 inches) on sides and 150 mm (6 inches) on ends.
  - .5 Reinforce around all projections and drains using additional ply of base sheet as per manufacturers instructions.
- 3.9
- .1 Mop apply base sheet flashing in [SEBS 890-12], [SEBS 890-12 LT], [SEBS 890-12LT2] asphalt applied at a rate of 1.25 kg/m<sup>2</sup> (25 lbs/100ft<sup>2</sup>).
  - .2 Begin application 100 mm (4 inches) from toe of cant and extend vertically as indicated. Mechanically fasten base sheet flashing using 25 mm (1 inch) round top nails on 200 mm (8 inches) centres. Refer to manufacturers standard details.
- 3.10
- .1 Mop applied base sheet flashings: Apply base sheet flashing in [SEBS 890-12], [SEBS 890-12 LT], [SEBS 890-12LT2] asphalt applied at a rate of 1.25 kg/m<sup>2</sup> (25 lbs/100ft<sup>2</sup>).
  - .2 Begin application 100 mm (4 inches) from toe of cant and extend vertically as indicated. Mechanically fasten base sheet flashing using 25 mm (1 inch) round top nails on 200 mm (8 inches) centres. Refer to manufacturers standard details.
- 3.11 Expansion Joints (Membrane set in Hot Asphalt)
- .1 At raised curb expansion joint details, install expansion joint membrane at the plane of the air/vapour barrier membrane.
  - .2 Loop flashing membrane down into joint ensuring that the depth of loop is a minimum 35 mm or 1.5 x the width. Extend flashing membrane minimum of 150 mm (6 inches) on each side of joint. Lap end joints a minimum of 150 mm (6 inches).
  - .3 Construct curbs, install insulation and overlay as specified.
  - .4 Apply membrane base sheet flashing in [SEBS 890-12], [SEBS 890-12 LT], [SEBS 890-12LT2] asphalt and membrane cap sheet flashing as per manufacturers' instructions to base sheet. Refer to manufacturers' standard details.
  - .5 Mechanically fasten base sheet flashing using 25 mm (1 inch) round top nails on 200 mm (8 inches) centres.
- 3.12
- .1 Apply a flood coat of hot asphalt at the rate of 3.0 kg/m<sup>2</sup> (60 lbs./100 ft.<sup>2</sup>) and allow to cool.
  - .2 Apply second flood coat of hot asphalt at the rate of 3.0 kg/m<sup>2</sup> (60 lbs./100 ft.<sup>2</sup>) and embed gravel at 20 kg/m<sup>2</sup> (450 lbs./100 ft.<sup>2</sup>) while bitumen is still hot.

END OF SECTION