

## **6750.1 TABLE OF CONTENTS**

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## **6750.2 DESCRIPTION**

- 6750.2.1 The work shall consist of deck preparation, supply and installation of a hot applied rubberized asphalt membrane waterproofing system and the supply and installation of wick drains.
- 6750.2.2 The waterproofing Subcontractor shall be officially recognized as an Approved Contractor by the manufacturer of the rubberized asphalt membrane and shall be approved by the Ministry.
- 6750.2.3 Waterproofing work shall be performed only by skilled applicators using the appropriate equipment to properly complete the work.

## **6750.3 MATERIALS**

- 6750.3.1 The Contractor shall supply the following materials:
- 6750.3.1.1 Shot blasting and sand blasting material.
  - 6750.3.1.2 Primer and cutback.
  - 6750.3.1.3 Rubberized asphalt membrane.
  - 6750.3.1.4 Membrane reinforcement sheet.
  - 6750.3.1.5 Protection board.
  - 6750.3.1.6 Preformed rubber sheet.

6750.3.1.7 Wick drains.

- 6750.3.2 Primer shall conform to requirements of the rubberized asphalt membrane manufacturer.
- 6750.3.3 Primer shall be cut back, prior to application, with an equal volume of gasoline or other approved alternative cut-back asphalt product.
- 6750.3.4 The Contractor shall submit to the Ministry, prior to start of operations, a product data sheet and MSDS for the primer to be used. A copy of the MSDS shall be kept on site by the Contractor while the product is being applied and/or stored on site.
- 6750.3.5 The rubberized asphalt membrane shall be one of the approved products listed in BM100 Approved Products, found on the Ministry's *Doing Business with the Ministry*.
- 6750.3.6 The rubberized asphalt membrane shall be supplied in sealed waterproof containers.
- 6750.3.7 The Contractor shall submit to the Ministry, prior to start of operations, a product data sheet and MSDS for the rubberized asphalt membrane to be used. A copy of the MSDS shall be kept on site by the Contractor while the product is being applied and/or stored on site.
- 6750.3.8 The polyester fabric/fibreglass reinforcing sheet shall be one of the approved products listed in BM100 Approved Products, found on the Ministry's *Doing Business with the Ministry*.
- 6750.3.9 The Contractor shall submit to the Ministry, prior to start of operations, a product data sheet for the membrane reinforcing sheet to be used.
- 6750.3.10 The protection board shall be  $3.6 \pm 0.4$  mm in thickness and shall be one of the approved products listed in BM100 Approved Products, found on the Ministry's *Doing Business with the Ministry*.
- 6750.3.11 The Contractor shall submit to the Ministry, prior to start of operations, a product data sheet for the protection board to be used.
- 6750.3.12 Preformed rubber sheet shall be 300 mm wide and shall be one of the approved products listed in BM100 Approved Products, found on the Ministry's *Doing Business with the Ministry*.

6750.3.13 The wick drain shall be made of 2 - 150 mm wide strips folded into a 75 mm width and stacked one on top of the other.

## **6750.4 CONSTRUCTION**

### **6750.4.1 Equipment**

- 6750.4.1.1 An approved melting kettle shall be used for melting rubberized asphalt membrane. The kettle shall be the double boiler, indirect fired, oil transfer type with a built-in mechanical agitator and equipped with accurately calibrated thermometers to register the temperatures of both the heating oil and the membrane.
- 6750.4.1.2 The kettle shall have a minimum capacity of 270 imperial gallons.
- 6750.4.1.3 The Contractor shall have an air compressor on site with a minimum discharge capacity of 150 cubic feet per minute for blast cleaning and cleaning of the surface to be waterproofed.
- 6750.4.1.4 Use of rotary air blowers will not be accepted.
- 6750.4.1.5 The portable shot blast cleaning unit shall be able to strip, clean and profile simultaneously, and shall remove all surface laitance and contamination to expose sound mortar and aggregate.
- 6750.4.1.6 The portable shot blast cleaning unit shall leave the cleaned concrete surface dry and chemical free.
- 6750.4.1.7 The shot provided for the blasting operation shall be suitable to provide the proper surface profile for the waterproofing membrane.
- 6750.4.1.8 A separate calibrated thermometer, with an accuracy of  $\pm 2^{\circ}\text{C}$ , to verify the material temperature shall be available on site.

### **6750.4.2 Surface Preparation**

- 6750.4.2.1 The surface preparation shall consist of shot blasting the concrete deck, abutment slabs and approach slabs and sand blasting up the vertical face of concrete traffic barriers or curbs to a height 100 mm above the slab surface and any portion of the slabs which cannot be shot blasted.
- 6750.4.2.2 The concrete deck will have spray painted reference marks. Surface preparation will be considered acceptable when the shot

blasting effort used to prepare the deck is sufficient to remove the painted reference marks completely from the concrete surfaces.

- 6750.4.2.3 All loose material shall be removed with a jet of oil free compressed air.
- 6750.4.2.4 At the end of shot and sand blasting each day, the debris material left on the deck shall be removed and disposed of appropriately.

#### 6750.4.3 Seepage Drains

- 6750.4.3.1 As part of the bridge construction operations, seepage drains may have been installed as identified on the Bridge Plans.
- 6750.4.3.2 The Contractor shall temporarily seal the seepage drains during priming and waterproofing operations to ensure that none of the primer or rubberized asphalt material is lost during their application.
- 6750.4.3.3 After completion of the waterproofing operation, the Contractor shall remove the protection board and waterproofing membrane from directly over the seepage drain and remove the temporary seals. The diameter of the access hole through the protection board and the waterproofing membrane to the seepage drains shall be equal to the inside diameter of the seepage drain  $\pm 1/8"$ . Great care shall be taken not to damage the rubberized waterproofing membrane at the outside perimeter of the seepage drains.
- 6750.4.3.4 The Contractor shall submit to the Ministry, a proposal which details the materials and methods to be used to temporarily seal the seepage drains. The proposal shall be submitted at least two weeks prior to the start of waterproofing operations and is subject to Ministry approval.

#### 6750.4.4 Deck Drains

- 6750.4.4.1 The Contractor shall temporarily seal all deck drains during operations to ensure that none of the primer or rubberized asphalt material is lost during application.
- 6750.4.4.2 The Contractor shall unseal all deck drains, when operations are delayed or temporarily shut down, so as to allow for unrestricted drainage of water from the deck.

- 6750.4.4.3 The Contractor shall submit to the Ministry, a proposal which details the materials and methods to be used to temporarily seal the deck drains. The proposal shall be submitted at least two weeks prior to the start of waterproofing operations and is subject to Ministry approval.

#### 6750.4.5 Wick Drains

- 6750.4.5.1 When identified on the Bridge Plans, wick drains shall be installed along the bottom of the concrete traffic barriers or curbs between seepage drains or drain boxes. The wick drains shall be extended a minimum of 200 mm into the seepage drains or drain boxes.
- 6750.4.5.2 At abutments, the wick drains shall extend along the concrete traffic barriers or curbs from the rear face of the expansion joint dam to the nearest seepage drain or drain box.
- 6750.4.5.3 Where it is necessary to splice the wick drain, top and bottom splices shall be laterally offset by a minimum of 300 mm.
- 6750.4.5.4 The wick drain shall be placed directly on top of the hot applied rubberized asphalt membrane and shall be covered by protection board, as shown on the Bridge Plans.

#### 6750.4.6 Surface Priming

- 6750.4.6.1 Where not in conflict with these specifications, the primer shall be applied according to manufacturer's instructions.
- 6750.4.6.2 The Contractor shall apply the primer to the clean, dry concrete slabs and up the vertical face of concrete traffic barriers or curbs to a height 80 mm above the slab, at a rate of not less than 0.25 litres per square metre.
- 6750.4.6.3 Primer shall not be applied to wet or damp concrete surfaces, or to surfaces which have not been sufficiently dried to prevent egress of water vapor which would prevent development of a good bond to the surface. The "Poly Patch Test" (ASTM Specification D4263) shall be used to confirm the dryness of surface.
- 6750.4.6.3.1 Drying of the concrete surface shall not be expedited by application of a torch or by other means.

6750.4.6.3.2 Any surface contamination which accumulates in the interim between blast cleaning and priming shall be removed prior to priming.

6750.4.6.4 The structure shall be primed as soon as possible following the blast cleaning operation to minimize contamination of the deck in the interim

6750.4.6.5 The tack coat shall be applied only when the concrete is dry and clean, and when the air and concrete surface temperatures are above 5° Celsius. Waterproofing equipment or material shall not be permitted on the tack coat until it has fully cured and is completely tack-free.

#### 6750.4.7 Construction Joint Treatment

6750.4.7.1 Construction joints between the approach slabs and the abutment slabs shall be protected with a preformed rubber sheet.

6750.4.7.2 Installation of the preformed rubber sheet shall be performed as follows:

6750.4.7.2.1 Spread a 3 mm thick layer of hot applied rubberized asphalt membrane in a 400 mm wide strip, centred on the construction joint, across the prepared deck width and continue 70 mm up the face of the traffic barriers or curbs.

6750.4.7.2.2 Place a 300 mm wide preformed rubber sheet into the membrane, while the membrane is still tacky.

6750.4.7.2.3 The sheet shall extend across the prepared deck width and 30 mm up the face of the traffic barriers or curbs.

6750.4.7.2.4 Apply an additional 3 mm thick layer of hot applied rubberized asphalt membrane over the rubber sheet and extending 50 mm beyond the edges of the rubber sheet.

### 6750.1.1 Hot Applied Rubberized Asphalt Membrane Base Coat

- 6750.1.1.1 The primer shall be completely dry before the rubberized asphalt membrane may be applied.
- 6750.1.1.2 The cakes of rubberized asphalt membrane shall be melted in a melting kettle. The melting kettle shall keep the contents continuously agitated until the material can be drawn free flowing and lump free at a temperature not exceeding that recommended by the membrane manufacturer.
- 6750.1.1.3 After the rubberized asphalt has been melted, the Contractor shall draw 100 litres of the rubberized asphalt from the kettle as a test. The rubberized asphalt may be returned to the kettle after the test.
- 6750.1.1.4 A protective sheet shall be placed under the kettle to catch any drippings.
- 6750.1.1.5 A base coat of hot applied rubberized asphalt membrane shall be applied to the clean, dry, blast cleaned and primed deck surface. The base coat shall be carried 80 mm up the vertical face of the barriers.
- 6750.1.1.6 The base coat of hot applied rubberized asphalt membrane shall not be applied to wet surfaces, or to surfaces which have not been sufficiently dried to prevent egress of water vapour which would prevent development of a good bond to the surface.
- 6750.1.1.7 The base coat shall have a minimum thickness of 2 mm with a maximum local variation of  $\pm 1$  mm.
- 6750.1.1.8 The Contractor shall check the rate at which the membrane is being applied by means of a volumetric coverage test, immediately upon commencing application operations.

### 6750.1.2 Reinforcing Sheet

- 6750.1.2.1 The reinforcing sheet shall be tight and wrinkle free and shall come in full contact with the membrane base coat.
- 6750.1.2.2 All edges of the reinforcing sheet shall be lapped a minimum of 50 mm.

6750.1.2.3 The reinforcing sheet shall extend up the vertical face of concrete traffic barriers or curbs to a height of 70 mm above the slab surface.

6750.1.3 Hot Applied Rubberized Asphalt Membrane Top Coat.

6750.1.3.1 A second coat of hot rubberized asphalt membrane shall be applied over the reinforcing sheet and shall extend up the vertical face of concrete traffic barriers or curbs to a height of 80 mm above the slab surface.

6750.1.3.2 The top coat shall be approximately equal in thickness to the base coat.

6750.1.3.3 The top coat in combination with the base coat and the reinforcing sheet shall provide a minimum total membrane thickness of 5 mm with a maximum local variation of  $\pm 1$  mm.

6750.1.3.4 At no point shall the combined thickness of the two coats of the hot applied rubberized asphalt membrane and the reinforcing sheet be less than 5 mm.

6750.1.3.5 A coverage test shall be conducted periodically throughout the operation to ensure compliance with the specified application rate.

6750.1.4 Membrane Protection Board

6750.1.4.1 Protection board shall be laid onto the completed membrane immediately after the top coat has been applied, while it is still tacky.

6750.1.4.2 The protection board shall come in full contact with the membrane.

6750.1.1.1 Protection boards shall be laid on the asphalt membrane, commencing at the low end of the bridge and overlapping to produce a shingling effect in both longitudinal and transverse directions, while the membrane is still hot, with the length of the board running transversely, on the deck.

6750.1.1.2 The longitudinal (parallel to the crown of the bridge) joints of successive protection boards shall be staggered a minimum of 150 mm.

6750.1.1.3 The protection boards shall be placed with all edges overlapping 12 mm to a maximum of 25 mm both longitudinally and transversely.

The protection board edge shall be within 5 mm of all wick drains, vertical faces of drains and vertical or near vertical faces at deck joints.

6750.1.1.4 The protection boards shall be trimmed to fit within 6 mm of the concrete traffic barriers or curbs and deck drains.

#### 6750.1.2 Site Cleanup

6750.1.2.1 The Contractor shall be responsible for cleanup and disposal of all excess shot and sand for the blast cleaning operation.

6750.1.2.2 The Contractor shall be responsible for the cleanup and disposal of all materials that result from the waterproofing and installation of the wick drain; including all shipping materials, excess materials, etc.

6750.1.2.3 The Contractor shall dispose of all waste materials in an environmentally acceptable manner, and in compliance with all local and provincial laws and regulations.

### 6750.2 WARRANTY

6750.2.1 The waterproofing materials manufacturer(s) shall supply the Ministry with a written and signed document, guaranteeing the performance of the product for a period of 5 years from the date of acceptance.

6750.2.2 The Contractor shall supply the Ministry with a written and signed document, certifying that all work completed shall remain, as installed, free from any defect, for a period of 5 years from the date of acceptance.

### 6750.3 PAYMENT

6750.3.1 Payment for BLAST CLEANING will be at the contract lump sum price. The lump sum price for Blast Cleaning will be full compensation for completing the work including but not limited to supply of all labour, equipment and materials required for shot and sand blasting the concrete slabs and relevant portions of the barriers and for cleanup.

6750.3.2 Payment for WATERPROOFING will be at the contract lump sum price. The lump sum price for Waterproofing will be full compensation for completing the work including but not limited to supply of all labour, equipment and materials

required for waterproofing the concrete slabs and relevant portions of the barriers; for the supply and installation of the wick drain; and for cleanup.