

ITEM 09595.50 M - MEMBRANE WATERPROOFING SYSTEM FOR STRUCTURAL SLABS

Description:

This work shall consist of furnishing and applying a membrane waterproofing system where indicated on the Contract Plans. The work shall include the preparation of concrete surfaces. The Contractor shall select, furnish, and apply one of the membrane waterproofing systems included in this specification on each structure designated to receive Membrane Waterproofing System for Structural Slabs.

The Contractor has the option of using any one of the membrane waterproofing systems included in this specification, as desired. Also substitution of one system for another may be done at will. However, only a single system may be used on any one structure, regardless of the length or design of that structure. No system may be substituted for any system which is already in any stage of installation.

Materials:

Membrane Waterproofing Materials: The membrane waterproofing shall be one of the following proprietary preformed sheet systems:

Bituthene Preformed System - shall consist of Bituthene System 4000 Surface Conditioner, Bituthene System 4000 Membrane, and Bituthene Mastic; all as manufactured by W.R. Grace and Company, Cambridge, Massachusetts.	Protecto-Wrap Preformed System - shall consist of Protecto-Wrap No. 80 Primer, Protecto-Wrap Jiffy Seal 140/60 Membrane, and Protecto-Wrap 160H Mastic; all as manufactured by Protecto-Wrap Company, Denver, Colorado.	Royston Preformed System - shall consist of Royston Royal-Gard (104AHTN) membrane, Royston Roybond 713-A primer, and Royston Roskote A-51 Black Mastic; all as manufactured by Royston Laboratories, Inc., Pittsburgh, Pennsylvania.
---	---	--

Protective Sheet: The protective sheet shall be a 3 mm asphalt core protection board or in accordance with the membrane manufacturers recommendations.

Construction Details:

General. Work shall not begin on existing structural slabs until seven (7) days have passed subsequent to the placement of portland cement concrete, portland cement mortar or epoxy mortar for structural slab repair. The Engineer may waive the seven day requirement if the areas of repair can sustain loads without damage or deformation. There are various other types of concrete repair materials which have different required periods of waiting prior to safe loading. If one of these is used, the Manufacturer's instructions for allowable loading shall be followed subject to the concurrence of the Engineer.

On new structural slabs, the provisions of Section 555-3.09 Curing, shall be met prior to membrane system placement.

Work shall not be done during wet weather conditions nor when atmospheric conditions are such that unsatisfactory results will be produced. The engineer shall be the sole determiner of favorable atmospheric conditions. No work shall be done when the concrete structural slab surface temperature is below 10°C, or ambient temperatures are below 10°C. The concrete structural slab shall be surface dry at the time of application of the membrane waterproofing system.

Structural Slab Cleaning: All structural slab surfaces and any other surfaces against which the membrane

ITEM 09595.50 M - MEMBRANE WATERPROOFING SYSTEM FOR STRUCTURAL SLABS

waterproofing system is to be placed shall be cleaned as follows:

1. All loose material, including dirt, gravel, and concrete laitance shall be removed by vacuuming or blowing with compressed air.
2. Any excess laitance (surface film of concrete), road oil, other bituminous-based materials, previous membrane treatments, and other foreign materials, including concrete curing compounds, shall be removed by sandblasting or wire brushing and washing with water or a combination of these methods. To confirm the adequacy of the cleaning, small test patches of primer and membrane shall be applied to any area(s) in question. These test patches shall then be evaluated by the Engineer. The Engineer may order additional cleaning where poor adhesion is found.
3. Immediately prior to application of the membrane system, surfaces to be coated shall be recleaned of dust and other loose material by vacuuming or blowing with compressed air.

Application of Preformed Sheet Membrane Systems:

A. **Primer Application.** After cleaning, all surfaces to be waterproofed shall be primed with the primer required for the selected preformed system. The primer shall be thoroughly mixed prior to application. Mixing shall be done with mechanical mixers or by hand mixing using clean paddles or other suitable instruments. Hand mixing shall be required for the Royston Primer.

The primer shall be applied, without dilution, using brushes, squeegees, rollers, or a combination of these methods. Spray application of the primer shall not be allowed. The primer shall be applied at the rate stated in the manufacturer's written instructions, and shall uniformly cover the surface. Areas of concrete which are porous and appear dry shall be given a second coat of primer.

On vertical surfaces, the primer shall be applied and finished off, in a neat line, to a height that will be 25 mm higher than the height of the completed overlay.

The primer shall be allowed to dry to a "tack free" condition prior to application of the preformed membrane. Excess primer, occurring as puddles or wet areas, shall be removed by brushes, or as directed by the Engineer. The appearance of bubbles in the primer is normal, due to out gassing of air and moisture in the concrete. After the primer has dried to a "tack free" condition, these bubbles shall be broken with squeegees or brooms. Unless otherwise directed by the Engineer, it shall not be necessary to repair the areas where bubbles have been broken.

Primed areas which have not been covered with preformed membrane within 24 hours of primer application shall be reprimed if required by the membrane manufacturer. All such repriming work shall be done at no additional cost to the State.

B. Preformed Sheet Membrane Installation:

ITEM 09595.50 M - MEMBRANE WATERPROOFING SYSTEM FOR STRUCTURAL SLABS

1. **General.** The preformed membrane sheets and “flashing strips” shall be placed longitudinally on the structural slab so that both the longitudinal and transverse overlaps are formed in the direction of water drainage. “Flashing strips” shall be defined to mean sections of membrane which are used to waterproof vertical surfaces and seal the intersection of the vertical surface with the structural slab.

Rolls of preformed sheet membrane may be applied by hand or mechanical means. The sheet shall be placed on the structural slab, sticky side down. Preformed sheet membrane flashing strips shall be placed and turned up the vertical faces to a height equal to the thickness of the overlay. Rolls of sheet membrane shall be placed in such a manner as to minimize wrinkles and bubbles. Stiff bristled brooms shall be used at the time of application to smooth the sheet at its point of contact with the structural slab. Unless otherwise noted herein, adjacent rolls of sheet shall overlap a minimum of 50 mm on transverse laps and 200 mm on longitudinal laps.

The application of the sheet membrane shall proceed as follows:

- a. Before the rolls of sheet membrane are applied to the slab, flashing strips shall be applied to the vertical faces where the direction of water drainage is toward the vertical face. The “flashing strips” shall be placed so that their overlaps are formed in the direction of water drainage. The flashing strips shall extend up the vertical face to the depth of the overlay and a minimum of 150 mm onto the structural slab. Where required, the vertical faces shall be coated with mastic to ensure adhesion of the flashing strip.
- b. Rolls of preformed sheet membrane shall then be aligned parallel to and applied on the structural slab. The preformed sheet shall be placed within 25 mm of abutting vertical faces.
- c. After the rolls of sheet membrane have been applied to the slab, flashing strips shall be applied to the vertical faces where the direction of water drainage is away from the vertical face, so the flashing strip is on top of the sheet membrane.
- d. The vertical termination of the flashing strips shall be sealed with a bead of mastic. The completed membrane shall be free of large wrinkles, “fishmouths”, air bubbles, and other placement defects. These shall be corrected in a manner satisfactory to the Engineer. Where patches are used, the area shall be coated with mastic sealer and pieces of membrane pressed into the sealer over the defective area. The patches shall extend at least 150 mm in every direction beyond the edge of the defect. Bubbles of 25 mm diameter and greater shall be vented by piercing with an ice pick, or other suitable instrument, and expelling the air. Vented bubbles need not be repaired.

To insure adhesion to the structural slab, the preformed membrane shall be rolled with the roller recommended by the membrane manufacturer. Laps which have not been thoroughly sealed by rolling operations shall be sealed with mastic.

When only a portion of the membrane application is completed in one day, the exposed edge of the membrane shall be sealed with mastic. The termination edge of the membrane at slab ends and expansion joints constructed without headers shall be sealed with mastic sealer.

Protective sheet shall be applied in accordance with membrane manufacturer’s recommendations.

Bithuthene System. Rolls of preformed membrane shall be placed on the structural slab, sticky side

ITEM 09595.50 M - MEMBRANE WATERPROOFING SYSTEM FOR STRUCTURAL SLABS

down, by removing the release paper as the work progresses. The membrane shall not be stretched or otherwise placed in tension during the installation.

On granite and other rough vertical faces, mastic shall be applied to the vertical face to ensure bonding of the flashing strips.

Protecto-Wrap System. Rolls of preformed membrane shall be placed on the structural slab, sticky side down. To minimize wrinkles and bubbles, the rolls of membrane shall be stretched into place. The membrane is interwound with polyethylene release film on the top surface. Except for the perforated edge strip, the film shall be left-in-place until the day the overlay is placed. The perforated edge strip of the polyethylene film shall be removed at the time of placement of an overlapping roll of membrane. Spliced rolls of membrane have release film on the bottom (sticky) side, so care shall be taken to ensure removal of the release film from spliced areas at the time of membrane application.

All vertical surfaces shall be coated with mastic, to the depth of the overlay, before placement of the flashing strips.

Royston System. Rolls of membrane shall be placed on the structural slab, sticky side down, by removing the release paper as the work progresses. The polyester film on the surface of the membrane need not be removed.

Adjacent rolls of sheet shall overlap a minimum of 100 mm on transverse laps. End laps shall be sealed by heating the membrane surface to be covered with a propane torch, melting the polyester film and fusing the melted surface to the underside of the covering roll.

Flashing strips shall be adhered to vertical surfaces by the heat-fusion method: by heating the sticky side of the membrane and pressing the heated surface into contact with the vertical face.

Mastic shall not be used to adhere the flashing strips to the membrane sheets.

Wrinkles in the membrane may be repaired by slitting the membrane and heat fusing the overlapping pieces. Mastic shall be used to seal the edges of the repair areas.

Method of Measurement:

The work shall be measured as the number of square meters of surface area of the structural slab as shown on the plans covered with the complete membrane waterproofing system. No separate measurement of the vertical faces shall be made.

Basis of Payment:

The unit price bid per square meter for this item shall include the cost of furnishing all labor, materials, and equipment necessary to complete the work. No payment will be made for any work necessitated by damage or defacement attributable to the Contractor's operations. No additional payment will be made for any repriming done in conformance with the requirements of Application of Preformed Sheet Membrane Systems, Subsection A, Primer Application. No additional payment will be made for patching damaged areas of a membrane system.