

ITEM 23595.31 M - BUTYL RUBBER MEMBRANE

1. DESCRIPTION

The work shall consist of furnishing and placing a butyl rubber membrane waterproofing course where indicated on the contract plans. The work shall include the cleaning and preparation of a metal substrate.

2. MATERIALS

A. Butyl Rubber Membrane

The membrane shall be 2mm thick.

B. Rubber membrane shall be a compound butyl elastomer of the IIR Family (Iso butylene-Iso prene rubber) conforming to the following requirements.

Color:	Black	
Specific gravity	1.20± 0.05	ASTM D 297
Tensile strength	8.27 MPa (1200 psi) (min)	ASTM D 412
Modulus @ 300% elongation	4.13 MPa (600 psi) (min)	ASTM D 412
Elongation	300% (min)	ASTM D 412
Tear resistance, die C	86.2 Kpa (125 psi) (min)	ASTM D 624
Hardness, shore A	60± 10 with 5-sec. interval before reading	ASTM D 2240
Ozone resistance, 70 Jr. @ 40°C in 50 PPHM Ozone; 20% elongation	No cracks	ASTM D 1149
Heat aging, 7 days @ 116°C	Tensile 5.79 MPa (840 psi) (min) elongation 210% (min)	ASTM D 573
Maximum vol. Swell (Tricresyl Phosphate Immersion) 72 hr. @ 100°C	10%	ASTM D 471
Operating temperature range	-40°C to 135°C	
Water absorption, vol. Change 7 days @ 70°C	less than 1%	ASTM D 471

C. Adhesive

The Contractor shall provide written certification to the D.C.E.S. stating that the adhesive for securing butyl rubber membrane to the steel backing plate is compatible to the membrane waterproofing and with the steel to which it is bonded.

D. Cement

Cement for splicing rubber membrane shall be a self-vulcanizing butyl rubber compound conforming to the following requirements:

Viscosity @ 25°C	Brookfield Viscometer #3 Spindle @ 10 rpm	1700-3400 cps 30% (min)
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Cement shall be applied at a minimum rate of 7.5 liter per 14. square meter based on both mating surfaces.

E. Butyl Gum Tape

Butyl gum tape for splicing butyl membrane shall be black, vulcanizable butyl rubber with an 8-mil polyethylene film backing. The tape shall be 30 mils (± 4) thick, including the backing.

3. CONSTRUCTION DETAILS:

General

- DISAPPROVED**
- A. Surfaces which are to receive the membrane shall be cleaned. The Contractor may use any equipment, and methods, acceptable to the Engineer, which will achieve an acceptable clean surface. An acceptable clean surface is defined by SSPC VIS 1, Surface Preparation, CSt3. Surface Preparation CSt3 is the minimum level of cleanliness which will be accepted for application of membrane.
 - B. Primed surfaces which the Engineer determines have become contaminated by dust or dirt shall be reprimed. Primed areas which have not been covered with membrane within 24 hours of primer application shall be reprimed. All such repriming work shall be done at no additional cost to the State.
 - C. For surfaces to be waterproofed with rubber membrane, the adhesive shall be applied to ballast retainers and ends of deck in a solid area extending a minimum of 910 mm from each end of ballast plate. At the Engineer's option, adhesive may be applied to the entire surface to be waterproofed. Adhesive shall be applied in a thin layer (by using a roller or brush as recommended by the manufacturer) at a minimum rate of 3.5 liters per 5.5 square meter based on both mating surfaces.
 - D. The Engineer shall visually confirm that the surface to be bonded to is free of dirt, grease, or any other foreign material. All areas in questions shall receive 610 mm x 610 mm test patches of adhesive and membrane. These test patches shall then be evaluated by the Engineer. The Engineer may order additional cleaning where test patches exhibit bubbles, delaminations, or other properties which negatively effect the bond strength. All additional cleaning shall be done at no cost to the State.
 - E. Membrane sheets shall first be positioned and drawn tight without stretching. Half of the membrane is then uniformly rolled up in a direction away from the starting edge or subsequent splice. Adhesive is now applied to the exposed area. Allow adhesive to dry so as to not stick to a dry finger touch. The membrane is now unrolled and pressed firmly and uniformly in place, using care to avoid trapping of air. The same procedure is repeated for the remaining half of the membrane sheets. Wrinkles and buckles shall be avoided. Each succeeding sheet shall be positioned

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to fit the previously installed sheet and spliced.

- F. Splices shall be of tongue-and-groove type as shown on the plans. All seam, lap and splice areas shall be cleaned with heptane, hexane, toluene, tricholethylene or white gasoline, using a clean cloth, mop or similar synthetic cleaning device. Cement shall be spread continuously on seam, lap and splice areas at a uniform rate of not less than 7.5 liters per 14 square meter based on both mating surfaces. After cement is allowed to dry until it will not stick to a dry finger tough, apply butyl gum tape to cemented area of membrane, extending firmly into place, obtaining full contact. Bridging and wrinkles shall be avoided. Corner splices shall be reinforced with two continuous layers of rubber membrane over one layer of butyl tape.
- G. All holes in the membrane sheeting shall be patched with a minimum overlap of 100mm and in accordance with manufacturer's instructions.
- H. During construction, care shall be exercised to prevent damage to waterproofing membrane by men or equipment.

4. METHOD OF MEASUREMENT

The work shall be measured as the number of square meter of membrane waterproofing system installed according to these specifications.

5. 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 repriming done in conformance of the requirements of Paragraph 3 of Construction Details. No additional payment will be made for patching damaged areas of a membrane system.

