# **TIMBER BRIDGE DECK WATERPROOFING (DRAFT)**

**MEMBRANE**

**Description**

The Contractor shall furnish and apply a self-adhered rubberized asphalt waterproof membrane system and all timber surface preparation work necessary to install the membrane system. The deck waterproofing membrane shall be installed prior to placement of the asphalt wearing surface.

Membrane waterproofing application shall be in accordance with the manufacturer’s instructions. The handling, storing, and addition of primer coating membrane components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer’s recommendations.

Product approval shall require, by the Manufacturer, that the membrane system meets the material specifications, and that the entire membrane system is designed and tested as waterproofing for use on timber bridge deck applications.

**Submittals**

The Contractor shall submit to the Engineer for approval the following documents:

1. Initial submission:
	1. The membrane system material specifications including product performance data.
	2. Certified independent test reports demonstrating conformance to Table 1.
		1. The independent lab shall be recognized by the National Cooperation for Laboratory Accreditation (NACLA) in Construction Materials Engineering and Testing (CMET) or an equal program approved by the Engineer.
			* All testing shall be performed by one independent lab unless approved by the Engineer.
		2. Independent testing reports must be dated within two (2) years from the anticipated start of membrane installation.
			* Samples for all required testing shall be fabricated at the same time. Test reports shall denote the lot of material as well as the sample fabrication and testing dates.
	3. Safety data sheets (SDS) for all components.

**Materials**

The membrane waterproofing system shall be:

* Self-adhering to applied surfaces
* Usable on irregular surfaces
* Able to accept asphalt overlays within one hour of application

The total minimum base thickness for the membrane shall be 65 mils. The membrane shall be able to meet the criteria specified in Table 1.

The membrane waterproofing system shall be asbestos-free. Any required primer shall promote adhesion of the membrane to the timber surface. The chemical composition of the primer, and membrane that make up the membrane waterproofing system shall conform to the Manufacturer’s specifications for the material. All components shall be approved by the Manufacturer as being compatible for use with the specified membrane. Cleaning solvents shall also be approved by the Manufacturer for use with the membrane.

**Material Delivery And Storage**

All components of the membrane system shall be delivered to the site in the Manufacturer’s original packaging, clearly identified with the products type and batch number. The Contractor shall provide the Applicator with a storage area for all components. The area shall be cool, dry, out of direct sunlight, and comply with relevant health and safety regulations. Copies of material safety data sheets for all components shall be kept on site by the Contractor.

**Table 1: Waterproofing Membrane Material Properties**

|  |  |  |
| --- | --- | --- |
| **Property** | **Test** | **Requirements** |
| Thickness | ASTM D1777 | 65mils |
| Strip Tensile Strength  | ASTM D882 | 50 lbs./in width |
| Grab Tensile Strength | ASTM D4632 | 160lbs. |
| Puncture Resistance | ASTM E154 | 200lbs. |
| Permeance-Perms | ASTM E96 (Method B) | 0.05max |
| Elongation at break of fabric | ASTM D4632 | 60% |
| Pliability at low temperatures (-15°F) | ASTM D146 | No Cracks |

**Application Procedure**

The installation procedure shall consist of preparation of the timber surface and application of primer and membrane. Special attention shall be paid to the bridge deck surface preparation prior to the membrane waterproofing system application.

The membrane waterproofing system shall not be applied in either wet, damp or foggy weather, or when the ambient temperature is 45°F or below or is forecast to fall below 45°F during the application period. The temperature of the timber deck surface shall also exceed the dew point by at least 5°F.

The membrane waterproofing on bridge decks shall not be placed until the Contractor is ready to follow within 24 hours with the first layer of hot mix asphalt (HMA) pavement; a longer period of time will be allowed only with prior written approval from the Engineer.

Where the areas to be waterproofed are bound by a vertical surface including, but not limited to, a curb or a wall, the membrane waterproofing system shall be continued up the vertical as necessary. A neat finish with well-defined boundaries and straight edges shall be provided.

1. TIMBER surface preparation

Follow the manufacturer’s recommendations for timber bridge deck surface preparation before application of the membrane waterproofing system. Drive screws flush with the top of the timber bridge deck board surfaces. All surfaces shall be trimmed free of rough spots, projections, or other defects which might cause puncture of the membrane so that the surface profile of the prepared timber surface shall not exceed a ¼ inch amplitude, peak to valley. Areas that do not meet this criteria shall be repaired prior to the application of any primer. Depressions outside the manufacturer’s tolerances shall be filled to a smooth flush surface with an approved rapid setting patching material that is compatible with the membrane waterproofing system.

1. Applying Primer

For systems requiring a primer, primers shall only be applied when the temperature of the timber deck surface exceeds the dew point by at least 5°F and when the timber deck surface has a moisture content of 15% or less as confirmed by a portable electronic surface moisture meter supplied by the Contractor.

The primer shall be applied in a manner to ensure full coverage. The primer shall consist of one coat with an overall coverage rate of 125-175 ft2/gal unless otherwise recommended in the Manufacturer’s written instructions. All components shall be measured and mixed in accordance with the Manufacturer’s recommendations. The primer shall be allowed to cure tack-free for a minimum of 30 minutes or as required by the Manufacturer’s instructions, whichever time is greater, prior to application of the waterproofing membrane.

A second coat of primer shall be required if the first coat is absorbed by the timber. The membrane shall be applied within the primer re-coat drying time allowed by the Manufacturer but in no case shall it exceed 24 hours. Beyond this period, the surface shall be prepared again and re-primed following the Manufacturer’s recommendations prior to membrane application.

1. Applying Membrane

The waterproofing membrane shall be applied in a methodical manner. The Applicator shall follow the approved application procedure. Provide minimum overlapping seams as specified by the Manufacturer. Unless approved by the Engineer, the membrane shall be applied to the deck in accordance with the Manufacturer’s instructions.

Following the application of the membrane waterproofing system, the cured surface shall be visually inspected. If any defects or pinholes are found, an appropriate quantity of membrane material shall be repaired in accordance with Section 5, Repairs, below.

1. PAVING OVER MEMBRANE

Placement of the HMA surface shall be in conformance with Division 6 of the *Standard Specifications* and the contract specifications. During paving, a light soap spray should be applied to the paving equipment wheels to prevent removal of the tack coat.

1. Repairs

If an area of membrane requires repair or if the membrane becomes damaged, a patch repair shall be carried out to restore the integrity of the membrane waterproofing system. The damaged area shall be cut back to sound materials and wiped with a solvent up to a width of at least 6 inches beyond the periphery of the damaged area, removing contaminants. The timber shall be primed as necessary, followed by the application of the membrane. A continuous layer shall be obtained over the timber with a 6 inch overlap onto the existing membrane. The solvent shall be approved by the membrane waterproofing manufacturer. Repairs shall comply with the Manufacturer’s guidelines.

The existing membrane/day joint shall be cleaned of all contamination including tack coat material or dirt to an edge distance of at least 6 inches and wiped with a solvent as approved by the membrane waterproofing manufacturer.

**Protection of Exposed Surfaces**

The Contractor shall exercise care in the application of the waterproofing materials to prevent surfaces not receiving treatment from being spattered or marred. Particular reference is made to the face of curbs, copings, finished surfaces, substructure exposed surfaces, and outside faces of the bridge. Any material that spatters on these surfaces shall be removed and the surfaces cleaned to the satisfaction of the Engineer.

**Acceptance**

Acceptance of the membrane waterproofing system shall only take place once it is determined by the Engineer that the membrane has been installed in accordance with the Special Provisions and plans and that all necessary documentation has been submitted.

NCDOT shall perform visual inspection of the application during the installation of the membrane system.

**Basis of Payment**

No separate payment will be made for *Timber Bridge Deck Waterproofing Membrane.*  Furnishing and applying the bridge deck waterproofing membrane shall be incidental to the *Timber Bridge Deck System* pay item.

Payment will be made under:

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| --- | --- |
| **Pay Item** | **Pay Unit** |
| Timber Bridge Deck System  | Lump Sum |