

500 STRUCTURES

ITEM 512 - WATERPROOFING

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512.01 Description. This work consists of the designated type of waterproofing to structures.

512.02 Materials. Furnish materials conforming to the following:

Asphalt Cement	702.01
Asphalt primer for waterproofing	702.02 (RC-70, or RC-250) 702.05
Emulsified asphalt primer	702.04, (MS-2, SS-1)
Asphalt for waterproofing	702.06
Waterproofing Fabric	711.24
<i>Sheet Type 2 Membrane Waterproofing</i>	<i>711.25</i>
<i>Sheet Type 3 Membrane Waterproofing</i>	<i>711.29</i>

512.03 General. *Apply an even and uniform coating of asphalt materials using brushes, squeegees, or spray equipment.*

If using spray equipment, provide portable power pressure type spraying equipment capable of being moved to the location of the waterproofing operation.

Protect concrete surfaces not covered with waterproofing from overspray, spilling, or otherwise marring of the surface with asphalt materials.

Ensure that the edge of any exposed application is sharply defined true to line with a uniform exposure.

512.04 Preparation of Surface.

- (a) **Asphalt Materials.** Remove concrete projections. Use wire brushes and clear water, remove dirt and the outside film of cement. Before applying asphalt materials, ensure that the concrete is clean and dry and the concrete temperature is at least 40 ° F (4° C).
- (b) **Membranes.** Remove protrusions from the concrete. Sweep off dirt and dust, and blow the concrete clean. Fill joints or cracks greater than 3/8 of an inch (10 mm) wide with Portland cement mortar. In addition to the above, remove oil and grease from surfaces for Type 3 membranes using water and a detergent designed to remove oil and grease from concrete. Flush residual detergent from the surface. Do not allow traffic on the cleaned surface.

512.05 Primer Coat. Apply the primer coat at a rate of 0.10 to 0.15 gallon (0.50 to 0.70 liters) of asphalt material per square yard (meter).

For primer coats applied between June 1 and September 1, *use asphalt primer for waterproofing or emulsified primer conforming to Item 512.02.*

For primer coats applied between September 1 and June 1, *use asphalt primer conforming to Item 512.02.*

If practical, use spray equipment when applying asphalt emulsion.

If subjected to traffic, spread sand on the primer coat for protection. Broom off excess sand before applying asphalt waterproofing .

512.06 Type A Waterproofing. This type of waterproofing consists of 1 primer coat and at least 2 coats of asphalt material conforming to 702.06 to provide a total of 1 gallon (5 L) of asphalt per square yard (meter) on flat areas and at least 1/2 gallon (3 L/m) on vertical or sloping surfaces. Start applying the waterproofing at the lowest point and progress to a higher elevation. Uniformly cover the surface except apply more asphalt in corners and over construction joints. Apply the asphalt material at a temperature from 250° F (121° C) to 350° F (177° C).

512.07 Type B Waterproofing. This type of waterproofing consists of 1 primer coat and at least 2 coats of asphalt material conforming to 702.06 and two layers of waterproofing fabric conforming to 711.24, applied as follows:

- (a) On the cleaned dry and well primed surface apply a thorough coating of asphalt at a temperature of from 250° F (121° C) to 350° F (177° C).
- (b) Apply the coating at a rate of at least 1/3 gallon (1.5 liters) per square yard (meter) of surface.

(c) While the asphalt is hot enough to penetrate the fabric, lay the fabric according to the following :

- (1) **Surfaces Wider than Normal Fabric Strip.** For the first strip, lay a half-width (normally 18 inches (0.5 meter)) of fabric. For the second strip use a full width strip of fabric and lap the entire width of the first strip. Lap each succeeding strip 2 inches (51 mm) more than half its full width. Lap the fabric strips in the direction of flow of water.
- (2) **Surfaces with the Same Width as Fabric Strip.** For the first strip lay a full width strip. For the second strip, lay another full width strip, covering the first.

Each strip shall be laid without wrinkles, folds or pockets. Thoroughly coat the strip with asphalt for the full width of the lap before laying the succeeding strip is. Each application shall entirely conceal the texture of the fabric.

- (d) Apply a final coat of asphalt to provide a thorough covering for the fabric.
- (e) For all three coats, use a total of 1 gallon (5 L) of asphalt waterproofing material per square yard (meter).

Lap ends of fabric strips at least 12 inches (0.3 m), and stagger the end joints.

512.08 Type D Waterproofing. This type of waterproofing consists of 1 primer coat, 1 ply of waterproofing fabric section conforming to 711.24 over joints, 3 coats of asphalt material conforming to 702.06 and 2 shingled plies of asphalt saturated waterproofing fabric conforming to 711.24.

Prime the surface to be waterproofed and allow the primer to dry. Fill joints and irregularities in the surface with asphalt cement. Lay a ply of fabric extending at least 9 inches (230 mm) on both sides of all joints. Leave the underside of this ply unbonded to the concrete surface.

Apply the asphalt at a temperature from 250 ° F (121° C) to 350° F (177° C), and conceal the texture of each layer of fabric with the asphalt. Use at least 1/3 gallon (1.5 L) of asphalt per square yard (meter) of surface for each application. Begin applying the asphalt and fabric at the low side or sides of the surface and proceed toward the apex or high side so that water runs over and not against or along the laps of the fabric. Lay the fabric without wrinkles, folds or pockets. Lap ends of fabric strips at least 12 inches (0.3 m) and stagger the end joints.

Start applying waterproofing by mopping asphalt on a surface slightly wider than half the width of the fabric strip. Immediately lay a half width strip of the fabric onto the asphalt. Mop asphalt on this strip and an adjacent surface slightly wider than half the width of the fabric, and lay a full width of fabric that entirely covers the first strip. Mop asphalt on the second half of this second strip and an adjacent concrete surface and lay a third strip of fabric that laps the first placed strip at least 2 inches (50 mm). Continue this process of applying asphalt and laying fabric until the entire surface is covered; and each strip of fabric shall lap the next to last strip already placed by at least 2 inches (50 mm). Finish laying fabric with a partial-width strip and mop the entire surface with asphalt.

512.09 Type 2 Membrane Waterproofing. *This type of waterproofing consists of a rubberized asphalt and peel-and-stick waterproofing membrane per Section 711.25. If ambient temperature is below 50 ° F (10° C), use a manufacturer-recommended primer coat for vertical surface application. After installing the primer coat, if required, remove the membrane's release liner and place the adhesive side on the prepared concrete surface. Lay the membrane smooth and free of wrinkles. Lap joints in membranes by at least 1 inch (25 mm). Store membrane materials indoors at temperatures not to exceed 120 °F (49° C).*

512.10 Type 3 Membrane Waterproofing. *This type of waterproofing consists of a primer coat conforming to 705.09 and a waterproofing membrane consisting of a high-density asphalt mastic between 2 layers of polymeric fabric conforming to Section 711.29.*

Keep membrane and primer materials dry before installation.

Heat the membrane primer in an oil primer heated, double-jacket kettle. Use a kettle that is clean and free of other materials with any obvious buildup scraped out. The Contractor may use a single-jacket kettle if the primer is capable of being heated in direct fire to the application temperature. Heat primers within the manufacturer's recommended temperatures.

On bridges with curbs, apply the primer and membrane 3 inches (75 mm) up the curb face. On prestressed box beam bridges with no approach slab, apply the primer and membrane 6 inches (150 mm) over the ends of the beams. On prestressed and slab bridges with approach slabs, apply the primer 2 feet (600 mm) out onto the approach slab.

If the plans require a Type 3 membrane on the top exterior surface of precast concrete three- or four-sided structures, apply the primer and membrane to overlay the vertical exterior sides of the structure by 12 inches (300 mm).

Apply primer no further than 5 feet (1.5 m) in front of the membrane using a squeegee to fill all voids and imperfections. Apply membrane from the low to the high side of the surface. Apply an extra bead of primer at the edge of the membrane. Lap

joints in membranes by at least 3 inches (75 mm). After installing the membrane over the entire surface, seal joints in the membrane by applying primer and smoothing with a V-squeegee.

512.11 Method of Measurement. The City will measure Waterproofing of the type specified by the number of square yards (square meters) *or on a lump sum basis.*

512.12 Basis of Payment. The City will pay for accepted quantities at the contract prices as follows:

Item	Unit	Description
512	Square Yard (Square Meter) or <i>Lump Sum</i>	Type A Waterproofing
512	Square Yard (Square Meter) or <i>Lump Sum</i>	Type B Waterproofing
512	Square Yard (Square Meter) or <i>Lump Sum</i>	Type D Waterproofing
512	Square Yard (Square Meter) or <i>Lump Sum</i>	Type 2 Waterproofing
512	Square Yard (Square Meter) or <i>Lump Sum</i>	Type 3 Waterproofing