

SECTION 07100**DAMPPROOFING AND MEMBRANE WATERPROOFING****07100.01 GENERAL****A. Description**

Dampproofing and membrane waterproofing shall include, but not necessarily be limited to, furnishing and applying coal tar or asphalt dampproofing and membrane waterproofing on finished concrete surfaces where indicated in accordance with the Contract Documents.

B. Related Work Included Elsewhere

1. Structure excavation; Section 02220.
2. Cast-in-place concrete structures; Section 03300.
3. Precast concrete utility structures; Section 03400.

C. Quality Assurance

1. Inspection and Testing

- a. The Engineer will inspect all materials before and/or after installation to ensure compliance with the Contract Documents. When specific materials tests are required by the referenced standards and specifications, the Engineer will have the option of requiring that any or all of these tests be performed for materials furnished for a specific project. When testing is required, it will be specified herein or in the "Special Provisions".
- b. The finished surface of dampproofed areas shall be free of dull or porous spots. Membrane waterproofed areas shall be free of cuts, holes, pockets, bulges, wrinkles, folds, or creases. The Contractor shall recoat or repair defective areas to the satisfaction of the Engineer.

2. Experience

Applicators shall be fully qualified and certified by the manufacturers of the products being applied.

3. Storage

Fabric shall be stored in a dry protected place. The rolls shall not be stored on their ends. Bituminous materials in containers shall be kept closed when not in use.

D. Submittals

1. Shop Drawings

- a. Shop drawings shall be submitted as specified in the "General Provisions" for dampproofing and membrane waterproofing materials furnished. The shop drawings shall include manufacturer's data for all materials including recommended handling, mixing, and application requirements.
- b. Working drawings shall also be submitted which shall include joint, corner, penetration, and anchorage details, and a description of the sequence of operation. The submittal shall also show details of application around expansion and contraction joints, and pipes, sleeves, drains, or other penetrations.

2. Certificates of Compliance

Certificates of compliance shall be submitted in accordance with the "General Provisions" for all dampproofing and membrane waterproofing materials stating that the material furnished meets the requirements specified in Section 07100.02.

07100.02 MATERIALS**A. Materials Furnished by the County**

The County will not furnish any materials for dampproofing and membrane waterproofing.

B. Contractor's Options

The Contractor may furnish either asphalt or coal-tar mop coat for dampproofing and membrane waterproofing.

C. Detailed Material Requirements

1. Primers

- a. Primer for use with coal-tar pitch in dampproofing and waterproofing shall meet the requirements of AASHTO M 121 except that one sample shall be taken for each 50 containers or fraction thereof.
- b. Primer for use with asphalt for dampproofing and waterproofing shall meet the requirements of AASHTO M 116.

2. Tars

- a. Tars shall meet the requirements of AASHTO M 52.

- b. Coal-tar pitch for dampproofing and waterproofing shall meet the requirements of AASHTO M 118.
 - c. Tar-seal coat for dampproofing shall be an RTCB-5 meeting the requirements of AASHTO M 52.
3. Asphalts
- a. Asphalt cements shall meet the requirements of AASHTO M 226, Grade AC-20, Table 2, except the requirement for percent loss on heating is deleted.
 - b. Asphalt for dampproofing and waterproofing shall meet the requirements of AASHTO M 115.
 - c. Asphalt based waterproof coating for exterior of manholes shall be mineral filled solvent type meeting requirements of Military Specification-C-82052.
4. Fabric for Waterproofing
- a. Fabric saturated with coal-tar pitch for waterproofing shall meet the requirements of AASHTO M 117 except that a minimum of three rolls per lot shall be sampled.
 - b. Fabrics saturated with asphalt for use in waterproofing shall meet the requirements of AASHTO M 117 except that a minimum of three rolls per lot shall be sampled.
5. Crackfiller

This material shall be a mixture of asphalt and mineral flour of such fineness that no appreciable separation will occur while being maintained in a liquid condition. The mixture shall meet the following requirements when evaluated by test methods noted in AASHTO M 115:

<u>Test</u>	<u>Specification Limits</u>
Penetration at 25 C, 100 g, 5 sec.	5.5 - 7.5 mm
Ductility at 25 C, mm, min.	300
Insoluble in trichloroethylene, %	15 - 26
Evaporation loss, % weight, 50 g, 5 hr, 163 C, max.	2

07100.03 EXECUTION**A. General**

It is understood that this section covers two separate and distinct methods of protection for concrete work, and the method to be used on the various parts of structures shall be as specified herein, unless otherwise provided for elsewhere in the Contract Documents.

B. Coating for Dampproofing

The coating for dampproofing shall consist of two or more coats of absorptive tar (prime coat) and one coat of tar seal (seal coat), as later described herein, and shall be applied to the following concrete surfaces:

1. entire rear surface of wall that will be in contact with the backfill, except that portion which is poured against undisturbed material;
2. all portions of the outside surface of sidewalls, top of top slabs, rear faces of headwalls, slope walls, and wingwalls of reinforced concrete box culverts that will be in contact with backfill;
3. all portions of the rear face of retaining walls that will be in contact with backfill;
4. all portions of the rear faces of wingwalls and headwall for structural plate pipes, pipe arches, and tunnel liners that will be in contact with the backfill;
5. full face of all contraction joints involved in any of the above;
6. exterior of all manholes and concrete water and sanitary sewer pipe.

C. Coating for Membrane Waterproofing

The coating for membrane waterproofing shall consist of a prime coat, three mop coats, and two layers of fabric, all as later described herein.

Membrane waterproofing shall be applied to the face of all construction joints for a width of 16 inches minimum centered on the joint for concrete structures next to backfill above normal water surface with earth on one side and atmosphere on the other side.

D. Surface Preparation

Dampproofing or membrane waterproofing shall not be applied until all provisions have been complied with for curing of concrete, protection against cold weather, and repairing of defective concrete surfaces. All concrete surfaces to receive coatings shall be reasonably smooth and free from projections and holes.

The concrete surfaces shall be dry.

Immediately before application of dampproofing or waterproofing, the surfaces shall be thoroughly cleaned of dust and loose materials.

When dampproofing and membrane waterproofing are specified for joint application, the membrane waterproofing shall be applied first.

When necessary, the Engineer will require the surfaces to be scrubbed with water and a stiff brush, after which all surfaces shall be allowed to become thoroughly dry before application of materials.

No dampproofing or membrane waterproofing shall be done when the temperature is 35°F or lower.

E. Application of Dampproofing

When dampproofing, care shall be taken to confine all coatings to the areas to be covered, and special care shall be observed to prevent disfigurement of any other parts of the structure that will be exposed to view in the completed structure.

The cured, cleaned and dry surfaces shall be coated as follows:

1. Paint with at least two coats of tar for absorptive treatment. The materials may be applied either by brushing or spraying. The amount of each coat shall be not less than 1/8 gallon per square yard of surface. Successive coats shall not be applied until the preceding coat has thoroughly dried. The material shall not be heated.
2. After the last absorptive or prime coat has thoroughly dried, one coat of tar-seal shall be applied by brush only. This coating shall consist of at least 1/8 gallon per square yard. When necessary, this material may be heated but not in excess of 150°F.

F. Application of Membrane Waterproofing

When membrane waterproofing, the cured, cleaned, and dry surfaces shall be coated with a prime coat and covered with mop coats and layers of fabric.

1. Coating Procedure

The surfaces shall first be coated with a primer, either by spraying or brushing. The amount of the primer coat shall be not less than 1/8 gallon per square yard of surface. An asphalt primer shall be used with the asphalt mop coat, and a tar primer shall be used with a tar mop coat. The primer shall be applied to give uniform coating. The priming coat shall be applied 24 hours in advance of applying any mop coats and shall be allowed to become thoroughly dry before the first mopping is applied. The primer shall not be heated.

After the primer coat has dried, the mop coats shall be applied.

Asphalt shall be heated to a temperature between 300 and 350°F, and tar for hot application shall be heated to a temperature between 200 and 250°F, with frequent stirring to avoid local overheating. The heating kettles shall be equipped with thermometers.

In all cases, the waterproofing shall begin at the low point of the surface to be waterproofed, so that water will run over and not against or along the laps.

The first strip of fabric shall be half width; the second shall be full width, lapped the full width of the first sheet; and the third and each succeeding strip shall be full width and lapped so that there will be at least two layers of fabric at all points and three layers with laps not less than 2 inches wide at edges of strips. All laps at ends of strips shall be at least 12 inches.

Beginning at the low point of the surface to be waterproofed, a section about 20 inches wide and the full length of the surface shall be mopped with the hot asphalt or tar. There shall be rolled into it, immediately following the mopping, the first strip of fabric, of half width, which shall be carefully pressed into place so as to eliminate all air bubbles and maintain surface configuration. This strip and an adjacent section of the surface of a width equal to slightly more than half the width of the fabric being used shall then be mopped with hot asphalt or tar, and a full strip, and a full width of the fabric shall be rolled into this, completely covering the first strip, and pressed into place as before. The forward or upgrade half of this second strip and an adjacent section of the concrete surface shall then be mopped with hot asphalt or tar and the third strip of fabric shingled on so as to lap the first strip not less than 2 inches. The process shall be continued until the entire surface is covered, each strip of fabric lapping at least 2 inches over the second strip below. The entire surface shall then be given a final mopping of hot asphalt or tar.

The completed waterproofing shall be a firmly bonded membrane composed of two layers of fabric and three moppings of asphalt or tar. Under no circumstances shall one layer of fabric touch another layer at any point or touch the surface, as there must be a complete coating of asphalt or tar between all layers of fabric.

In all cases, the mopping on the concrete shall cover the surface so that no gray spots appear, and on cloth it shall be sufficiently heavy to completely conceal the weave. Asphalt or tar shall be applied at a minimum rate of 12 gallons per 100 square feet on vertical surfaces. The work shall be so regulated that at the close of a day's work all cloth that is laid shall have received as many coatings as is required for that stage of completion. Special care be taken at all laps to see that they are thoroughly sealed down.

In all cases, an asphalt coated fabric shall be used with an asphalt mopping coat, and a tar fabric shall be used with a tar mopping coat.

2. Membrane Care

At the edges of the membrane and any points where it is punctured by such appurtenances as drains or pipes, the membrane shall be flashed in a manner acceptable to the Engineer to prevent water from getting between the waterproofing and the waterproofed surface.

Care shall be taken to prevent injury to the finished membrane by the passage over it of men or equipment or by throwing any material on it. Any damage which may occur shall be repaired by patching. Patches shall extend at least 12 inches beyond the outermost damaged portion, and the second ply shall extend at least 3 inches beyond the first.

07100.04 METHOD OF MEASUREMENT

Dampproofing and membrane waterproofing will not be measured.

07100.05 BASIS OF PAYMENT

Dampproofing and membrane waterproofing will not be paid for as separate items but are considered incidental to other items of work required in the construction of specific structures that will be paid for under various items indicated in the Proposal. Payment will constitute full compensation for all labor, equipment, tools, and incidentals necessary to complete the applications as specified.