

## SECTION 07111

## ELASTOMERIC MEMBRANE WATERPROOFING

## 1 GENERAL

## 1.1 SUMMARY (NOT APPLICABLE)

## 1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 297	(1981) Rubber Products
ASTM D 412	(1987) Rubber Properties in Tension
ASTM D 471	(1979) Rubber Property - Effect of Liquids
ASTM D 624	(1986) Rubber Property - Tear Resistance
ASTM D 1004	(1966, R 1988) Initial Tear Resistance of Plastic Film and Sheeting
ASTM D 4637	(1987) Vulcanized Rubber Sheet Used in Single-Ply Roof Membrane
ASTM E 96	(1990) Water Vapor Transmission of Materials
ASTM E 154	(1988) Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
ASTM G 21	(1970, R 1985) Determining Resistance of Synthetic Polymeric Materials to Fungi

## 1.3 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTALS:

## SD-04 Drawings

Waterproofing System; GA.

Detail drawings showing size of sheets, position of sheets and splices, flashing and termination details, and expansion joint details.

## SD-06 Instructions

## Installation; GA.

Manufacturer's instructions for installation of the elastomeric membrane, including procedures for preparing the membrane for use, flashing, and splicing. Instructions shall include recommended or required protective covering and procedures for safe handling and use of cleaners, adhesives, and sealants.

## SD-13 Certificates

## Materials; GA.

Certificates of compliance attesting that the materials meet specification requirements. Certificates may show qualification of the identical compound in the specified test.

## 1.4 DELIVERY, STORAGE, AND HANDLING

Materials shall be delivered to the job site in unopened containers bearing the manufacturer's name, brand name, and description of contents. Membrane, flashing, and adhesives shall be stored in clean, dry areas. Storage temperature for adhesives shall be between 60 and 80 degrees F. Protection board shall be stored flat and off the ground.

## 2 PRODUCTS

## 2.1 MATERIALS

All adhesives, mastics, cements, tapes, and primers shall be as recommended by the membrane manufacturer and shall be compatible with the materials to which they are to be bonded.

## 2.1.1 Performance Requirements

All membranes shall meet the following requirements when tested by the referenced ASTM standards:

Puncture Resistance (ASTM E 154)	40 pounds, minimum
Water Vapor Transmission at 80 degrees F Permeance (ASTM E 96, Procedure B)	0.25 perms (max.)
Resistance to Soil Bacteria or Fungi (ASTM G 21 or ASTM E 154)	No sustained growth or discoloration after 21 days

## 2.1.1.1 Butyl Rubber

Thickness, plus or minus 10 percent	60 mils
Specific Gravity (ASTM D 297)	1.2 plus or minus 0.05

Tensile Strength (ASTM D 412)	1200 psi (min.)
Elongation (ASTM D 624)	300 percent (min.)
Tear Resistance (ASTM D 624)	125 lb./inch (min.)
Water Absorption (ASTM D 471) 158 degrees F, 168 hours	plus 2 percent (max.)

#### 2.1.1.2 Plastic Elastomeric Sheeting

Membrane shall be a minimum of 56 mils thick and shall meet the following requirements:

Tensile Strength (ASTM D 412, Die C)	220 psi (min)
Elongation (ASTM D 412, Die C)	250 percent (min.)
Tear Resistance (ASTM D 1004)	350 lb./inch (min.)

#### 2.1.1.3 Composite Self-Adhering Membrane

Membrane shall be a polymeric sheeting integrally bonded to rubberized asphalt with a minimum thickness of 60 mils.

#### 2.1.1.4 Chlorinated Polyethylene (CPE) Sheeting

Membrane shall be uncured chlorinated polyethylene, synthetic elastomeric sheeting of 40 mils nominal thickness.

#### 2.1.1.5 Chloroprene

Chloroprene membrane shall conform to ASTM D 4637, Type II, Grade 1, Class U, 60 mils minimum thickness.

#### 2.1.1.6 Ethylene Propylene Diene Monomer (EPDM) Membrane

EPDM membrane shall conform to ASTM D 4637, Type I, Grade I, Class U, 60 mils minimum thickness.

#### 2.1.2 Protection Board

Protection board for waterproofing membrane shall be 1/2-inch minimum asphalt plank, 1/2-inch fiberboard or premolded bituminous protection board; 1/8-inch thick for vertical surfaces, and 1/4-inch thick for horizontal surfaces. The membrane and protection board must be compatible.

#### 2.2 ACCESSORIES

Flashing, counterflashing, expansion joint covers and corner fillets shall be as recommended by the membrane manufacturer.

### 3 EXECUTION

#### 3.1 PREPARATION

Surfaces to which waterproofing is to be applied shall be clean, smooth, and free from deleterious materials and projections. Holes, honeycomb, cracks, or cavities shall be pointed or filled and finished flush with portland cement mortar. Top surfaces of projecting metal or concrete ledges below grade, except footings, shall be beveled. Before waterproofing is applied, the surfaces to be covered shall be swept or brushed carefully to remove all dust and foreign matter. Concrete surfaces to receive elastomeric waterproofing will not be cured with compounds containing wax or oil.

#### 3.2 APPLICATION

Waterproofing shall not be applied to wet surfaces. The ambient and surface temperatures shall be above 40 degrees F during application. Membrane under slabs shall be carried up abutting vertical surfaces to the level of finish of floor or to within 1/2 inch of the top edge of base where base is shown and cemented solid to the substrate. Membrane shall not be continuous through walls, floors, piers, and columns unless otherwise shown. Concrete surfaces shall be primed to receive the membrane. Membranes shall be handled and installed in accordance with the approved installation instructions. All primers, adhesives, and mastics shall be applied in accordance with the membrane manufacturer's printed instructions. Laps shall be oriented so that water will flow over the lap, and not into them. As soon as the mastic is fully set and dry, joints shall be checked. Where any openings or fishmouths appear, joints shall be resealed and rerolled. Wrinkles and buckles shall be avoided in applying membrane and joint reinforcement. Nonadhering membranes shall be unrolled and allowed to remain flat for at least 2 hours before application. Membranes shall be drawn tight during installation without stretching. Self-adhering membrane shall be installed by removing the release sheets on the back of the membrane and applying the tacky surface onto the primed surface. Laps and splices shall be sealed prior to completion of a day's work.

##### 3.2.1 Butyl Rubber

Each sheet shall be lapped at sides and ends a minimum of 6 inches over the preceding sheet. Lap and splice areas of membrane shall be cleaned with heptane, hexane, or white gasoline. Six-inch-wide unvulcanized compounded butyl tape shall be applied between lapped splices so that the tape extends approximately 1/4 inch beyond the exposed sheeting edge. The tape shall be rolled firmly into place as it is applied. Tape backing shall be removed and the lapped sheeting rolled or pressed into place. Splicing adhesive shall be applied to the lapped area 3-1/2 inches on either side of the lapped edge. The splice adhesive shall be allowed to dry thoroughly and the lap reinforced with 6-inch-wide unvulcanized compounded butyl tape. Full contact shall be made for all lap areas. Corner splices and flashing overlaps shall be reinforced with a 12-inch-wide strip of membrane over one layer of butyl tape or with a prefabricated corner of butyl rubber.

### 3.2.2 Plastic Elastomeric Sheeting

Sheeting shall be applied in sections no longer than 18 feet. Each sheeting shall be lapped at sides and ends a minimum of 6 inches over the preceding sheet. Lap splices shall be reinforced with 12-inch-wide strips of plastic sheeting or as recommended in the approved installation instructions. Lap and splices shall be sealed in a full bed of adhesive at the rate recommended by the manufacturer of the material. Sheeting and joint strips shall be rolled with a 50 to 100 pound roller on horizontal surfaces, and a 6-inch rubber hand roller on vertical surfaces.

### 3.2.3 Composite Self-Adhering Membrane

On vertical surfaces, membrane shall be applied in lengths up to 8 feet starting at the bottom. Each sheet shall be lapped at edges and ends a minimum of 2-1/2 inches over the preceding sheets. The membrane shall be rolled to adhere with the substrate. Corners and joints shall be double-covered by first applying a 12-inch width of membrane centered along the corner joint. Inside and outside corners shall then be covered with membrane. Exposed termination edges of membrane on horizontal or vertical surfaces shall be finished with a troweled bead of mastic. Mastic shall be applied around termination edges of membrane and around drains and projections. Mastic shall be applied at the termination of each day's work.

### 3.2.4 Chlorinated Polyethylene (CPE) Sheeting

Sheets shall be lapped at edges and ends a minimum of 2-1/2 inches over the preceding sheet. All horizontal membranes shall overlap vertical surfaces by at least 3 inches.

### 3.2.5 Chloroprene Rubber Sheeting

Each sheet shall overlap the previously installed sheet by a minimum of 3 inches. Sheet shall be folded lengthwise to expose one half of the underside of the sheet for cleaning the sheet with cleaner recommended by the manufacturer. Adhesive shall be applied to sheet and substrate. Two coats of adhesive are required on the substrate with 1/2-hour between coats. Sheet shall not be bonded to substrate until adhesive does not come off at a dry finger touch. Chalk lines or masking tape shall be used as guides for adhesive application and positioning sheets. After adhesive has dried, sheet shall be folded back onto the substrate or previously applied sheet membrane. Membrane shall be rolled to obtain complete adhesion. The exposed edge of each sheet shall be further sealed with a fillet-shaped bead of adhesive, tooled to obtain positive contact with the surface of both sheets.

## 3.3 TESTS

When required, and after the system is cured, the membranes on horizontal surfaces shall be tested by flooding the entire waterproofed area with a minimum of 2 inches head of water for a period of 24 hours. There shall be no water added after the start of the period. Measure water level at the beginning and at the end of the 24-hour period. If the water level falls,

remove the water and inspect the waterproofing membrane. Leak sites shall be marked, dried and repaired, and the test shall be repeated.

### 3.4 PROTECTION

Horizontal applications of membrane shall be protected from traffic during installation. No equipment shall be allowed directly on the membrane. Plywood, or similar material, overlayment shall be provided for wheel-ways. Walkways shall be provided where heavy traffic from other trades is expected. Materials shall not be stored on the membrane. A protective covering shall be installed over the membrane immediately after installation or testing. If membrane is to be exposed, a temporary covering shall be applied to protect the membrane until the protection board is installed.

#### 3.4.1 Projections

Projections passing through membrane shall be flashed as recommended by the manufacturer of the waterproofing membrane.

#### 3.4.2 Counterflashing

Waterproofing connecting with work exposed to the weather shall be counterflashed to form a water-tight connection. Upper edge of membrane waterproofing and protective covering shall be counterflashed.

#### 3.4.3 Expansion Joints and Fillets

Expansion joints and corner fillets shall be installed as recommended by the manufacturer of the waterproofing membrane.

#### 3.4.4 Vertical Membrane Waterproofing

Waterproofing shall be protected with a 1/2-inch minimum fiberboard, 1/2-inch asphalt-impregnated fiberboard or 1/8-inch compatible water-resistant (bitumen type) protection board. Edges of protection shall be butted, and exposed surfaces shall be covered by a coating of bitumen.

#### 3.4.5 Horizontal Membrane Waterproofing

Waterproofing shall be covered with portland cement mortar not less than 3/4 inch thick, uniformly placed and allowed to set before subsequent construction is installed.

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