

# ETHYLENE PROPYLENE DIENE MONOMER (E.P.D.M.) ROOFING

## SECTION 6 - PRIMARY MEMBRANE

### 6.1 GENERAL

- .1 E.P.D.M. membrane designs can be categorized as a fully adhered, mechanically fastened and loose-laid ballasted.
- .2 For all designs the E.P.D.M. membrane shall be uniformly supported by an accepted substrate. The E.P.D.M. primary membrane shall be joined and sealed to the vapour retarder membrane extension at perimeters and penetrations.
- .3 Application of E.P.D.M. roofing systems must not be undertaken when the air temperature at roof level is colder than -18°C (0°F) with a wind velocity of more than 14.5 km/h (9 mph), or equivalent wind chill factor of 1300. When roof level temperature falls below +5°C (40°F), follow the E.P.D.M. manufacturer's cold weather membrane splicing and application requirements.
- .4 Roofing components shall not be applied during periods of rain, snow or similar moisture conditions.
- .5 All bitumen based materials and bitumen contaminated surfaces must be removed or covered with an acceptable underlayment as E.P.D.M. membrane is not compatible with bitumen.
- .6 The membrane should be applied so the flow of water will not be against the laps.

### 6.2 DESIGN CONSIDERATIONS

- .1 When developing an E.P.D.M. membrane system design, the Design Authority shall take the following items into consideration:

#### 6.2.1 Drainage Provision

- .1 The Warranty Certificate does not warrant the roof drainage system.
- .2 The Warranty Certificate covers the watertight integrity of the primary membrane and the seal of the roof flashing component, e.g. sheet metal flashing, drain or scupper flange. The Design Authority shall ensure that the drainage system is designed in accordance with the governing Plumbing and Building Code to provide positive drainage and accommodate a minimum roof drainage slope of 1:100 (1/8"/ft.).
- .3 Some isolated ponding water can be anticipated when drainage slope is provided.
- .4 ARCA Warranty Ltd. recommends that emergency or overflow drainage be incorporated into the roof drainage systems. The Warranty Certificate requires that emergency drainage be provided in designs using "flow control" type roof drains.
- .5 Splash pads shall be installed beneath drain outlets discharging water onto lower roofs to prevent the displacement of gravel ballast and damage to the primary membrane.

## **6.2.2 Roof Slope**

- .1 For a loose-laid ballasted design, maximum roof slope shall not exceed 1:6 (2"/ft.).
- .2 For mechanically fastened designs, maximum roof slope shall not exceed 1.5:1 (18"/ft.).
- .3 Installation of nailers may be required for insulated mechanically fastened designs. Please refer to the membrane manufacturer's recommendations for spacing and installation of nailers, when required.
- .4 For fully adhered designs, there are no roof slope restrictions.
- .5 Protected membrane and combination designs are not accepted for Warranty Certificate issuance.

## **6.2.3 Temporary Roofing**

- .1 For temporary roofing, E.P.D.M. membranes shall not be reused. Remove and dispose of the temporary membrane prior to the application of the permanent membrane.

## **6.3 E.P.D.M. ROOFING SYSTEMS COMPONENTS**

### **6.3.1 Ethylene Propylene Diene Monomer (E.P.D.M.) Membrane**

- .1 Reinforced and non-reinforced E.P.D.M. membranes shall comply with the requirements of CGSB 37-GP-52M. All membrane components shall be from the same manufacturer.
- .2 To prevent moisture infiltration, membrane rolls shall be covered during shipment and storage out of doors.
- .3 When an ARCA Warranty Ltd. Warranty Certificate is required select the appropriate membrane system from the list of Accepted E.P.D.M Membrane Systems.

### **6.3.2 Cleaners, Primers, Adhesives and Sealants**

- a) Splice Cleaners
  - .1 The splice cleaners shall be a solvent - based cleaner used to remove dust, dirt and other contaminants prior to the application of the splicing cement and lap sealant.
- b) Splicing Cement
  - .1 The splicing cement used for joining E.P.D.M. membranes shall be a butyl based contact cement, approved by the membrane manufacturer.
- c) Lap Sealant
  - .1 The lap sealant used to seal exposed E.P.D.M. membrane edges at splices shall be approved by the membrane manufacturer.

- d) Perimeter Membrane Securement Strip
  - .1 The perimeter membrane securement strip shall be a minimum 150 mm (6") wide strip of 1.1 mm (45 mil) thick reinforced E.P.D.M. membrane mechanically fastened to a vertical or horizontal substrate as approved by the membrane manufacturer.
- e) Bonding Adhesive
  - .1 The bonding adhesive to adhere E.P.D.M. membranes to various substrates shall be a high strength synthetic rubber adhesive as approved by the membrane manufacturer.
  - .2 The bonding adhesive may be a water or solvent based adhesive.

### 6.3.3 Accessories

- .1 Accessories used in the application of E.P.D.M. membranes shall be approved by the membrane manufacturer.
- .2 Accessories include flashing materials, termination bars, pourable sealers, sheet metal edgings and walkways.

### 6.3.4 Ballast

- .1 For loose-laid designs, the minimum ballast mass shall be 50 kg/m<sup>2</sup> (10 P.S.F.) evenly distributed over the field of the primary membrane.
- .2 The ballast may be comprised of crushed or river rounded gravel or concrete pavers.
- .3 Gravel ballast must be relatively free of dust and other foreign matter and of a size recommended by the membrane manufacturer.
- .4 When the ballast is comprised of crushed gravel, a protective fabric approved by the membrane manufacturer shall completely cover the primary membrane prior to ballast placement.
- .5 Concrete paver ballast shall be installed in accordance with the membrane manufacturer's application requirements and must not be placed directly on the surface of the unprotected primary membrane.
- .6 **Cautionary Note:**

When designing ballast requirements, interior building air pressure and external environmental conditions can cause excess forces on loose-laid designs.

ARCA Warranty Ltd. recommends that the design incorporate the standards identified in "Wind Design Guide Ballasted Single-Ply Roofing Systems" produced by the Rubber Manufacturer's Association and the Single Ply Roofing Institute (SPRI).

## 6.4 INSTALLATION

### 6.4.1 Loose-laid Ballasted Design

- .1 Loose-laid designs shall be comprised of minimum 1.1 mm (45 mil) thick unreinforced E.P.D.M. membrane loose-laid over a supporting substrate and retained in place with ballast.
- .2 For insulated systems, an ARCA approved insulation may be loose-laid over the vapour retarder.
- .3 Membrane rolls shall be positioned over the substrate, aligned and the exposed field membrane allowed to relax for a minimum of thirty (30) minutes before splicing. Adjoining membrane sheets shall overlap a minimum distance of 75 mm (3") to facilitate splicing.
- .4 A continuous perimeter E.P.D.M. membrane securement strip shall be installed along roof perimeter and roof penetrations mechanically fastened to the vertical or horizontal substrate with fasteners recommended by the membrane manufacturer.
- .5 Field membrane splices must be completed as work progresses (daily).
- .6 Ballast shall be applied at a minimum rate of 50 kg/m<sup>2</sup> (10 P.S.F.) over the field of the membrane as the application progresses.

**NOTE:** The Design Authority shall ensure sufficient ballast mass is selected to prevent blow-off of the loose-laid roofing system or collapse of the structure.

### 6.4.2 Adhered Design

- .1 Adhered designs may be comprised of either 1.5 mm (60 mil) thick non-reinforced or 1.1 mm (45 mil) thick reinforced E.P.D.M. membrane uniformly adhered to a supporting substrate with bonding adhesive and mechanically fastened along perimeter and penetrations.
- .2 For insulated systems, an ARCA Warranty Ltd approved insulation shall be mechanically fastened to the decking or adhered to a vapour retarder bonded to the roof deck.
- .3 Maximum 3000 mm (10 ft.) wide E.P.D.M. membrane rolls shall be positioned over the substrate, aligned and the exposed field membrane allowed to relax a minimum of thirty(30) minutes before splicing laps. To permit splicing, adjoining sheets must be overlapped a minimum distance of 75 mm (3").
- .4 The membrane sheet shall be pulled back on itself to expose approximately one half of its underside.
- .5 The back surface of the membrane and the top surface of the substrate must be cleaned to remove any accumulated dirt and debris.
- .6 Bonding adhesive shall be applied to the back of the E.P.D.M. membrane and to the top surface of the exposed substrate taking care not to coat the splice mating surfaces. The bonding adhesive must be allowed to flash off for proper adhesion.
- .7 When the bonding adhesive has flashed off, the coated membrane shall be rolled into the adhesive coated substrate, taking care to minimize membrane wrinkling and ridging.

- .8 The balance of the membrane sheet shall be bonded using a similar process.
- .9 The bonded membrane shall be broomed to ensure adhesion with its supporting substrate.
- .10 After bonding, the primary membrane shall be mechanically fastened along the perimeter, at roof penetrations and at roof slope elevation changes exceeding 1:6 (2"/ft.).
- .11 Membrane field splices shall be completed as the work progresses.

### **6.4.3 Mechanically Fastened Design**

- .1 Mechanically fastened designs shall be comprised of minimum 1.1 mm (45mil) thick reinforced E.P.D.M. mechanically fastened in the centre of the lap with fasteners approved by the membrane manufacturer.
- .2 For insulated systems, an ARCA approved insulation must be secured to the roof deck over the vapour retarder.
- .3 E.P.D.M. membrane rolls should be positioned over the substrate, aligned and the exposed field membrane allowed to relax for a minimum of thirty (30) minutes before fastening and splicing. Adjoining sheets shall be overlapped a minimum distance of 150 mm (6") to facilitate mechanical fastening and splicing.
- .4 The bottom primary membrane sheet shall be mechanically fastened along the centre of the membrane splice using fasteners and fastener plates approved by the membrane manufacturer. Fastener types and spacing shall be determined by the design authority, for site conditions, such as deck type, building height and wind loads.
- .5 Membrane field splices must be completed as work progresses (daily).

## **6.5 SPLICING**

### **6.5.1 Splice Tape Method**

- .1 The top membrane shall be folded back at splices to expose the bottom membrane mating surface for cleaning and /or priming.
- .2 Both splice mating surfaces must be cleaned with a splice cleaner to remove accumulated dust, dirt and contaminants and allowed to dry.
- .3 Both top and bottom membrane splice surfaces must be primed and allowed to dry.
- .4 An approved splice tape shall be positioned on the bottom sheet. Align the self-adhering splice tape edge with the membrane edge and apply pressure with a silicone roller to ensure adhesion.
- .5 Self-adhering splice tape end laps shall overlap a minimum distance of 25 mm (1").
- .6 The top sheet splice surface shall be laid over the splice tape, any misalignment corrected, the splice tape release paper removed and the prepared surfaces mated with hand pressure.

- .7 The entire membrane splice must be rolled with a silicone roller to ensure complete adhesion between the splice tape and membrane.
- .8 The completed splice must be inspected for unbonded areas and any deficiencies corrected.

#### **6.5.2 Adhesive Method (Where Permitted)**

- .1 The top membrane shall be folded back to expose the bottom membrane mating surface for cleaning and /or priming.
- .2 Both splice mating surfaces shall be cleaned with splice cleaner to remove accumulated dust, dirt and contaminants and allowed to dry. A primer maybe substituted for cleaning the splice mating surfaces where permitted by the membrane manufacturer.
- .3 The prepared splice adhesive shall be applied to both membrane mating surfaces and allowed to flash off.
- .4 To ensure adhesive is ready for bonding, test adhesive using a clean, dry finger.
- .5 The prepared top sheet splice area shall be rolled into the base sheet splice and mated with hand pressure avoiding wrinkles and ridges.
- .6 The entire membrane splice surface must be rolled with a hand roller to ensure complete adhesion. Allow a minimum of four (4) hours for mating surfaces to bond prior to the application of the lap sealant.
- .7 Exposed membrane edges must be sealed with lap sealant, tooled to a feathered edge.

#### **6.6 MEMBRANE OVERLAPS AND "T" JOINTS JUNCTIONS**

- .1 Membrane splice overlaps and membrane "T" joint junctions shall be covered with a minimum of 150 x 150 mm (6 x 6") square of E.P.D.M. membrane or a self-adhering E.P.D.M. cover adhered to the primary membrane, as required by the membrane manufacturer.
- .2 Seal exposed cover flashing edges with lap sealant, tooled to a feathered edge.

#### **6.7 MEMBRANE LOAD PROTECTION**

- .1 Under no circumstance shall any equipment load be supported directly on the surface of an unprotected primary membrane.
- .2 For roof mounted equipment exceeding 91 kg (200 lbs.) in mass or when roof loads exceed 5 kPa (105 PSF) they shall be supported on minimum 200 mm (8") high curbs, sleepers or pedestals attached to the structure or decking. Roof mounted equipment includes antennae, signs, service lines, skylights, hatches and walkways. For new construction where H.V.A.C. equipment is supported by pedestals, a minimum clearance of 762 mm (30") shall be provided beneath the equipment to permit installation of the roofing system. Equipment supports shall be designed by a structural engineer and shall conform to the Alberta Building Code.

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- .3 Equipment loads 91 Kg (200 lbs.) or less in mass, may be supported by free floating sleepers or support pads loose laid over the roofing system. Free floating sleepers shall be pressure preservative treated wood, precast concrete, metal or specialty product. Free floating sleepers or pads shall be placed on a minimum 25 mm (1") thick layer of Type 4 insulation attached to the base of the supports without the use of mechanical fasteners. A ply of E.P.D.M. membrane applied to the primary membrane may be substituted for the Type 4 insulation protection layer.
- .4 When guy wires are used to anchor roof mounted equipment their anchorage points shall be waterproofed with 200 mm (8") high curbs or with gum boxes.
- .5 H.V.A.C. units, skylights and hatches shall be supported by insulated metal or wooden curbs supported by and fastened to the structural deck and extending a minimum distance of 200 mm (8") above the surface of the roofing system measured at the highest point.
- .6 To protect the primary membrane from concrete paver and/or walkway damage, a minimum 25 mm (1") thick layer of Type 4 insulation shall be placed between the walkway/pavers and the finished membrane surface. Place the Type 4 insulation so that the roof drainage is free to flow under the pavers/walkway.

## 6.8 ACCEPTED E.P.D.M. MEMBRANE SYSTEMS

### .1 **Carlisle SynTec Canada**

#### *Fully Adhered*

Minimum 1.1 mm (45 mil) thick SureSeal and  
1.5 mm (60 mil) thick SureWhite

#### *Loose-laid Ballasted*

Minimum 1.1 mm (45 mil) thick SureSeal

#### *Mechanically Fastened*

Minimum 1.1 mm (45 mil) thick SureSeal

### .2 **Firestone Building Products Canada**

#### *Fully Adhered*

Minimum 1.1 mm (45 mil) thick Rubbergard and  
1.5 mm (60 mil) or 2.2 mm (90 mil) thick Rubbergard EcoWhite

#### *Loose-laid Ballasted*

Minimum 1.1 mm (45 mil) thick Rubbergard

#### *Mechanically Fastener*

Minimum 1.1 mm (45 mil) thick Rubbergard and with QuickSeam RMA fastening strips

### .3 **Genflex Roofing Systems, LLC**

#### *Loose-laid Ballasted*

Minimum 1.1 mm (45 mil) thick EPDM membrane

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