6 EPDM - SECTION 6 – MEMBRANE

6.1 General

6.1.1 E.P.D.M. membrane designs can be categorized as fully adhered, mechanically fastened, and loose-laid ballasted.

6.1.2 For all designs the E.P.D.M. membrane shall be uniformly supported by an accepted substrate. The E.P.D.M. membrane shall be joined and sealed to the vapour retarder membrane extension at perimeters and penetrations.

6.1.3 Applications of E.P.D.M. roofing systems must not be undertaken when the air temperature at roof level is colder than -18°C and a wind velocity more than 14.5 km/h, or an equivalent wind chill of -26°C. When the roof temperature falls below -5°C, follow E.P.D.M. manufacturer's cold weather membrane splicing and application requirements.[23]

6.1.4 Roofing systems components shall not be applied during periods of rain, snow or similar moisture conditions.

6.1.5 E.P.D.M. membranes are not compatible with bitumen, remove or cover all bitumen-based materials with an acceptable underlayment.

6.1.6 Membranes should be applied so the flow of water will not be against the laps.

6.1.7 Protected membrane and combination designs are not accepted for ARCA Warranty Certificate issuance.

6.2 Design Considerations

6.2.1 Roof assemblies must meet the standards required by the authority having jurisdiction.

6.2.2 When developing an E.P.D.M. membrane system design, the design authority shall take the following items into consideration:

6.2.3 **Drainage Provision**

6.2.3.1 The Warranty Certificate does not warrant the roof drainage system.

6.2.3.2 The Warranty Certificate covers the watertight integrity of the membrane and the seal of the roof flashing components, e.g. sheet metal flanges, 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 minimum roof drainage slopes as follows:

6.2.3.2.1 Minimum 1:100 (1%) for Conventional Membrane Designs.

6.2.3.2.2 For a loose-laid ballasted design, maximum roof slope shall not exceed 1:6 (16.7%)

6.2.3.2.3 For mechanically fastened designs, maximum roof slope shall not exceed 1:1.5 (66.7%)

6.2.3.2.4 For fully adhered designs, there are no maximum roof slope restrictions.

6.2.3.3 Some isolated ponding water can be anticipated when drainage slope is provided.

6.2.3.4 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 for designs using "flow control" type roof drains.

6.2.3.5 Splash pads shall be installed beneath drain outlets discharging water onto lower roofs to protect the membrane from damage.

[23] EPDM 6.1.3 Revised April 30, 2020 (TB-2020-02)

6.2.4 **Roof Slope**

6.2.4.1 For insulated conventional designs, the design of the insulation blocking system is the responsibility of the design authority and is not covered by the Warranty Certificate.

6.2.4.2 To qualify for an ARCA 15 Year Warranty Certificate, each self-contained roof area shall have positive drainage with a minimum slope of 1:50 (2%).

6.2.4.3 Enclosed roof sections that include photovoltaic equipment shall be independently drained and shall have positive drainage with a minimum slope of 1:50 (2%).

6.3 E.P.D.M. Roofing System Components

6.3.1 **General**

6.3.1.1 To prevent moisture infiltration, membrane rolls shall be covered during shipment and stored out of doors.

6.3.1.2 Store membrane rolls so they are elevated and lying on their side, do not store rolls on end.

6.3.1.3 For Warranty Certificate issuance select the appropriate membrane system from the list of Accepted E.P.D.M. Membrane Systems.

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

6.3.2.1 Reinforced and non-reinforced E.P.D.M. membranes shall comply with the requirements of ASTM D4637 “Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane.”

6.3.2.2 All E.P.D.M. membrane components shall be from the same manufacturer.

6.3.3 **E.P.D.M. Membrane Accessories**

6.3.3.1 Splice cleaners shall be a solvent-based cleaner as required by the membrane manufacturer to remove dust, dirt and other membrane contaminants prior to the application of the splicing cement and lap sealant.

6.3.3.2 The splicing cement used for joining E.P.D.M. membranes shall be a butyl-based contact cement, approved by the membrane manufacturer.

6.3.3.3 The lap sealant used to seal exposed E.P.D.M. membrane edges at splices shall be approved by the membrane manufacturer.

6.3.3.4 The perimeter membrane securement shall be by continuous bars or screws and plates mechanically fastened to the vertical or horizontal substrate as approved by the membrane manufacturer. The perimeter membrane securement strip shall be a minimum 150mm (6") wide strip of 1.1mm (45 mil) thick reinforced E.P.D.M. membrane mechanically fastened to a vertical or horizontal substrate as approved by the membrane manufacturer.

6.3.3.5 The bonding adhesive to adhere E.P.D.M. membranes to accepted substrates shall be approved by the membrane manufacturer.

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

6.3.4 **Ballast**

6.3.4.1 The ballast may be comprised of crushed, river rounded gravel or concrete pavers.

6.3.4.2 Gravel (rock) ballast shall be relatively free of fines and other foreign matter and shall contain gravel sizes between 19.0mm (3/4") and 38mm (1 1/2") in diameter and shall conform to ASTM D7655-17 "Standard Classification for Size of Aggregate Used as Ballast for Membrane Roof Systems".

6.3.4.3 When the ballast is comprised of crushed gravel, a protective fabric approved by the membrane manufacturer shall completely cover the membrane prior to ballast placement.

6.3.4.4 For loose-laid and protected membrane designs, the minimum ballast mass shall be 50 kg/m² (10 P.S.F.) evenly distributed over the field of the membrane.

6.3.4.5 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 membrane.

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) and "A Guide for the Wind Design of Mechanically Attached Flexible Membrane Roofs" published by the Institute for Research in Construction, National Research Council of Canada.

6.4 Installation – E.P.D.M. Membranes

6.4.1 **Loose-laid Ballasted E.P.D.M. Membrane Design**

6.4.1.1 Loose-laid designs shall be comprised of minimum 1.1mm (45 mil) thick unreinforced E.P.D.M. membrane loose-laid over a supporting substrate and retained in place with ballast.

6.4.1.2 For insulated systems, an ARCA Warranty Ltd. approved insulation may be loose-laid over the vapour retarder.

6.4.1.3 Membrane rolls shall be positioned over the substrate and aligned before seaming. Adjoining sheets shall be overlapped a minimum distance of 75mm (3") to facilitate seaming. Allow membrane to relax for a minimum of thirty (30) minutes before seaming.

6.4.1.4 Continuous perimeter membrane securement shall be installed along roof perimeter and roof penetrations mechanically fastened to the vertical or horizontal substrate as recommended by the membrane manufacturer.

6.4.1.5 Field membrane seams shall be completed as the work progresses (daily).

6.4.1.6 Ballast shall be applied at a minimum rate of 50 kg/m² (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 **Fully Adhered E.P.D.M. Membrane Design**

6.4.2.1 Adhered designs may be comprised of minimum 1.5mm (60 mil) thick non-reinforced or 1.1mm (45 mil) thick reinforced E.P.D.M. membrane uniformly adhered to a supporting substrate and mechanically fastened along perimeter and penetrations. Consult with the membrane manufacturer for specific requirements for adhesive type and application rates for each accepted substrate or deck type.

6.4.2.2 For insulated systems, an ARCA Warranty Ltd approved insulation or cover board (if applicable) shall be mechanically fastened to the decking or adhered with an approved adhesive. The roof vapour retarder shall be fully bonded to the roof deck or thermal barrier when insulation is adhered with adhesive.

6.4.2.3 Maximum 3000mm (10 ft.) wide E.P.D.M. membrane rolls shall be positioned over the substrate, aligned and the exposed field membrane allowed to relax for a minimum of thirty (30) minutes prior to splicing laps. To permit splicing adjoining sheets must be overlapped a minimum distance of 75mm (3").

6.4.2.4 The membrane sheet shall be pulled back on itself to expose approximately one half of its underside.

6.4.2.5 The back surface of the membrane and the top surface of the substrate must be cleaned to remove any accumulated dirt and debris.

6.4.2.6 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. Bonding adhesive must be allowed to flash off for proper adhesion.

6.4.2.7 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.

6.4.2.8 The balance of the E.P.D.M. membrane sheet shall be bonded using a similar process.

6.4.2.9 The bonded membrane shall be broomed to ensure adhesion with its supporting substrate.

6.4.2.10 After bonding, the membrane shall be mechanically fastened along the perimeter, at roof penetrations and at roof slope elevation changes exceeding 1:6 (16.7%).

6.4.2.11 Membrane field splices shall be completed as the work progresses.

6.4.3 **Mechanically Fastened E.P.D.M. Membrane Design**

6.4.3.1 Mechanically fastened designs shall be comprised of minimum 1.1mm (45 mil) thick reinforced E.P.D.M. mechanically fastened in the centre of the lap with fasteners approved by the membrane manufacturer. Consult with the membrane manufacturer for the specific membrane securement configuration options.

6.4.3.2 For insulated systems, an ARCA Warranty Ltd approved insulation or cover board (if applicable) shall be mechanically fastened to the decking or adhered with an approved adhesive. The roof vapour retarder shall be fully bonded to the roof deck or thermal barrier when insulation is adhered in adhesive.

6.4.3.3 Maximum 3000mm (10 ft.) wide E.P.D.M. membrane rolls shall be positioned over the substrate, aligned and the exposed field membrane allowed to relax for a minimum of thirty (30) minutes prior to splicing laps. To permit splicing adjoining sheets must be overlapped a minimum distance of 75mm (3").

6.4.3.4 The bottom 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 load.

6.4.3.5 Membrane field splices shall be completed as the work progresses (daily).

6.5 Splicing – E.P.D.M Membranes

6.5.1 **General**

6.5.1.1 The top membrane shall be folded back at splices to expose the bottom membrane mating surface for cleaning and /or priming.

6.5.1.2 Both splice mating surfaces must be cleaned with a splice cleaner to remove accumulated dust, dirt and contaminants and allowed to dry.

6.5.1.3 Completed splices shall be checked for voids and unbonded areas by running a rounded screwdriver (probe) along the exposed edge of the seam. Any voids or gaps shall be corrected.

6.5.2 **E.P.D.M. Splice Tape Method**

6.5.2.1 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.

6.5.2.2 Self-adhering splice tape end laps shall overlap a minimum distance of 25mm (1").

6.5.2.3 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.

6.5.2.4 The entire membrane splice must be rolled with a silicone roller to ensure complete adhesion between the splice tape and membrane.

6.5.3 **E.P.D.M. Adhesive Method (where permitted)**

6.5.3.1 A primer may be substituted for cleaning the splice mating surfaces where permitted by the membrane manufacturer.

6.5.3.2 The prepared splice adhesive shall be applied to both membrane mating surfaces and allowed to flash off.

6.5.3.3 To ensure adhesive is ready for bonding, test adhesive using a clean, dry finger.

6.5.3.4 The prepared top sheet splice area shall be rolled into the base sheet splice and mated with hand pressure avoiding wrinkles and ridges.

6.5.3.5 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.

6.5.3.6 Exposed membrane edges must be sealed with lap sealant, tooled to a feathered edge.

6.5.4 **E.P.D.M. Pre-Taped Method**

6.5.4.1 Splice cleaner and primer need only be applied to the underlying sheet for side laps. End laps require standard splice tape and primer application for both mating surfaces.

6.5.4.2 Overlap membrane 100mm (4") for 75mm (3”) seam tape, or 175mm (7”) for 150mm (6”) seam tape.

6.5.4.3 Apply the primer uniformly a minimum of 25mm (1”) wider than seam tape application area. To ensure adhesive is ready for bonding, test adhesive using a clean, dry finger.

6.5.4.4 Position the membranes to overlap the seams evenly with the tape’s release backing still in place. Confirm the tape is in full contact with primed membrane surface along the side laps.

6.5.4.5 Remove the release backing by pulling at a 45° angle to the tape and close to the roofs surface. Apply pressure the entire length of the seam at a 45° angle as the release paper is being removed.

6.5.5 **Membrane Overlaps and "T" Joints Junctions**

6.5.5.1 Membrane splice overlaps and membrane "T" joint junctions shall be covered with a minimum 150mm x 150mm (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.

6.5.5.2 Seal exposed cover flashing edges with lap sealant, tooled to a feathered edge.

6.6 Membrane Load Protection

6.6.1 Under no circumstance shall any equipment load be supported directly on the surface of an unprotected membrane.

6.6.2 For roof mounted equipment exceeding 91 kg (200 lbs.) in mass or when roof point loads exceed 5 kPa (105 P.S.F.) they shall be supported on minimum 200mm (8”) high structural curbs, structural sleepers or structural 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 elevated above the roof membrane, a minimum clearance of 300mm (12”) 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 current National Building Code – Alberta Edition.

6.6.3 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 25mm (1”) thick layer of Type 4 extruded polystyrene insulation with a minimum compressive strength of 240 kPa (35 psi) attached to the base of the supports without the use of mechanical fasteners. A ply of E.P.D.M. membrane applied to the membrane may be substituted for the Type 4 insulation protection layer.

6.6.4 When guy wires are used to anchor roof mounted equipment their anchorage points shall be waterproofed with 200mm (8”) high curbs or with gum boxes.

6.6.5 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, extending a minimum distance of 200mm (8”) above the surface of the roofing system measured at the highest point.

6.6.6 To protect the membrane from concrete paver damage, a minimum 25mm (1") thick layer of Type 4 extruded polystyrene insulation shall be placed between the pavers and the E.P.D.M. membrane surface. Place the Type 4 extruded polystyrene insulation so that the roof drainage is free to flow under the pavers.[24]

6.6.7 Roof areas containing photovoltaic installations are not eligible for an ARCA 15 Year Warranty Certificate.

6.6.8 To qualify for an ARCA 15 Year Warranty Certificate, membrane protection shall be installed around all roof mounted mechanical equipment.[25]

[24] EPDM 6.6.6 Revised October 20, 2022 (TB-2022-06)

[25] EPDM 6.6.8 Revised October 20, 2022 (TB-2022-06)

6.7 Roof Terraces

6.7.1 Roof Terraces are to be installed over a minimum 12.7mm drainage mat membrane protection layer.

6.7.2 The designer must take into consideration the compressive strength of the underlying materials to prevent damage to the insulation and roofing membrane from concentrated loads exceeding 91kg (200 lbs.) in mass or when roof point loads exceed 5 kPa (105 PSF) which may exceed design limits. It is recommended that an ARCA approved HD coverboard is installed under the membrane for additional protection.[26]

6.7.3 Roof areas with roof terraces are eligible for five (5) or ten (10) year Warranty Certificates only.

6.7.4 The cost to remove and replace the roof terrace material to facilitate access to the roof membrane for investigation and repair of workmanship related leaks is included however; it is the responsibility of the building owner to cover costs for removal and replacement of items that were not installed by the roofing contractor. It is recommended that the design of the roof terrace incorporate future service and maintenance requirements.

6.7.5 Roof leaks as the result of membrane damage due to the work and activities of others, maintenance or from contaminants are not covered under the Warranty Certificate.

[26] EPDM 6.7.2 Revised February 11, 2022 (TB-2022-01)

6.8 Accepted E.P.D.M. Membrane Systems

6.8.1 Accepted E.P.D.M. membranes

Carlisle
EPDM Membranes

	Attachment Method				ARCA Warranty Certificate		
	Fully Adhered	Loose-Laid Ballasted	Mech. Fast.		5 Year	10 Year	15 Year
Sure-Seal (non-reinforced) 45 mil		●			●	●	
Sure-Seal (non-reinforced) 60 mil	●	●			●	●	
Sure-Seal (non-reinforced) 90 mil	●	●			●	●	●
Sure-White (non-reinforced) 60 mil	●	●			●	●	
Sure-White (non-reinforced) 90 mil	●	●			●	●	●
Sure-Tough (reinforced) 45 mil	●	●	●		●	●	
Sure-Tough (reinforced) 60 mil	●	●	●		●	●	
Sure-Tough (reinforced) 75 mil	●	●	●		●	●	

Approved Adhesives:
90-8-30A Bonding Adhesive
EPDM x-23 Low-VOC Bonding Adhesive
Low VOC Bonding Adhesive
Solvent-Free Bonding Adhesive
Aqua Base 120 Bonding Adhesive
Cav-Grip III Low-VOC Aerosol Contact Adhesive
Low VOC 1168 Bonding Adhesive

Elevate
EPDM Membranes

	Attachment Method				ARCA Warranty Certificate		
	Fully Adhered	Loose-Laid Ballasted	Mech. Fast.		5 Year	10 Year	15 Year
RubberGARD (non-reinforced) 45 mil		●			●	●	
RubberGARD (non-reinforced) 60 mil	●	●			●	●	
RubberGARD (non-reinforced) 90 mil	●	●			●	●	●
ECO-White (non-reinforced) 60 mil	●				●	●	
ECO-White (non-reinforced) 90 mil	●				●	●	●
RubberGARD MAX (reinforced) 45 mil	●	●	●		●	●	
RubberGARD MAX (reinforced) 60 mil	●	●	●		●	●	
RubberGARD MAX (reinforced) 75 mil	●	●	●		●	●	

Approved Adhesives:
BA-2004T Bonding Adhesive
Water Based Bonding Adhesive
EPDM Solvent Free Bonding Adhesive
Single Ply LVOC Bonding Adhesive
Jet Bond Spray Adhesive

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[27] EPDM 6.8.1 Revised July 4, 2023 (TB-2023-03)