

## **4 TP - SECTION 4 – VAPOUR RETARDERS**

### **4.1 General**

- 4.1.1** ARCA Warranty Ltd. requires the use of a vapour retarder membrane for insulated conventional or combination design thermoplastic roofing assemblies, when a Warranty Certificate is to be issued.
- 4.1.2** When a complete roof system, including the existing insulation is being replaced, a vapour retarder is required for the issuance of the Warranty Certificate.
- 4.1.3** The selection of the type and quality of the vapour retarder is a building design function and is the responsibility of the design authority. When selecting the vapour retarder membrane, the design authority should take into consideration a number of factors such as building occupancy, air conditioning, envelope seals and humidity levels during building construction. Concrete pouring and drywall mudding after roof installation may increase humidity design values. When the design of the building envelope does not include a vapour retarder due to the occupancy of the building, a technical variance request shall be submitted.
- 4.1.4** Upgrades to the minimum recommendations, including self-adhering composite vapour retarders, shall be installed as per membrane manufacturers written instructions.
- 4.1.5** The vapour retarder specifications recommended in this section are experience based for normal humidity conditions, 40% at 21°C. For higher humidity conditions the application of an additional ply of membrane or the use of a high-performance vapour retarder membrane is recommended.
- 4.1.6** To qualify for an ARCA 15 Year Warranty Certificate, a self-adhered or thermally fused vapour retarder is required.

### **4.2 Common Elements of Application**

- 4.2.1** The vapour retarder membrane shall be joined and sealed to the membrane at roof perimeters, vertical roof junctions and at roof penetrations.
- 4.2.2** The vapour retarder membrane shall wrap the insulation components and extend out over the coverboard and adhered to the surface a minimum distance of 150mm (6"). Alternatively, the vapour retarder membrane may be carried up and adhered to the vertical substrate a minimum distance of 50mm (2") above the top of the insulation or cover board.
- 4.2.3** Organic felt vapour retarders shall not be left unprotected when inclement weather or exceptional circumstances prevent the complete application of the roof assembly. The top ply of felt shall be protected with a uniform visible coating of bitumen.
- 4.2.4** Polyethylene vapour retarder shall be minimum 0.15mm (6mil) thick and shall conform to the CAN/CGSB 51.34 standard

### **4.3 Existing BUR Membranes s Vapour Retarders**

- 4.3.1** Only the membrane from an existing BUR protected membrane assembly shall be left in place and serve as the vapour retarder membrane for a replacement conventional or combination design roof assembly.
- 4.3.2** The existing membrane shall be prepared by removing any wet or deteriorated material, dust, dirt and debris. The complete surface, including any exposed substrate, shall be covered with a minimum one ply vapour retarder.

## 4.4 Minimum Recommended Vapour Retarders for Wood Decks

### 4.4.1 **General**

- 4.4.1.1 The direct application of hot bitumen to wood decks is not permitted.
- 4.4.1.2 The vapour retarder membrane shall be uniformly attached to its substrate.
- 4.4.1.3 For high humidity conditions add a minimum of one additional ply of No. 15 organic felt fully adhered into an interply mopping of hot bitumen applied at the approximate rate of 1 kg/m<sup>2</sup> (20 lbs/100 sq. ft).

### 4.4.2 **Organic Felt**

- 4.4.2.1 For the separator sheet, nail one ply No. 15 organic felt to wood deck using large head galvanized roofing nails spaced at approximately 150mm (6") centres for laps and approximately 300mm (12") centers for field of the sheet.

**Same clause as EPDM – cannot be used as an adhered system.**

- 4.4.2.2 For the vapour retarder, mop one ply No. 15 organic felt fully adhered to an ARCA approved auxiliary leveling surface in a full application of hot asphalt applied at the approximate rate of 1 kg/m<sup>2</sup> (20 lbs/100 sq ft).
- 4.4.2.3 Separator sheet/vapour retarder side laps shall be minimum 100mm (4") wide and end laps shall be a minimum 150 mm (6") wide.

### 4.4.3 **Kraft Laminate**

- 4.4.3.1 For the vapour retarder, nail one ply kraft laminate sheet to wood deck using large head galvanized roofing nails spaced at approximately 150mm (6") centers for laps and approximately 300mm (12") centers for the field of the sheet.
- 4.4.3.2 Alternatively, a one (1) ply kraft laminate sheet may be adhered in a full roller coating or in continuous ribbons of vapour retarder adhesive applied to surface of wood deck. Vapour retarder adhesive application rates shall be in accordance with adhesive manufacturer's recommended application rates.
- 4.4.3.3 Kraft laminate side laps shall be minimum 50mm (2") wide and end laps shall be minimum 150mm (6") wide. Laps shall be fully sealed with a continuous coating of vapour retarder adhesive or be fully sealed in hot bitumen prior to nailing.
- 4.4.3.4 For fully adhered thermoplastic systems, the insulation shall be mechanically fastened to the structural deck over the Kraft laminate vapour retarder.

### 4.4.4 **Asphalt Coated Base Sheet**

- 4.4.4.1 For the vapour retarder, nail one (1) ply asphalt coated base sheet to wood deck using large head galvanized roofing nails spaced at approximately 150mm (6") centers for laps and approximately 300mm (12") centres for field of the sheet.
- 4.4.4.2 Base sheet side laps shall be minimum 100mm (4") wide and end laps shall be minimum 150mm (6") wide.
- 4.4.4.3 Laps shall be fully sealed with an application of hot bitumen prior to nailing.

### 4.4.5 **Self-Adhesive Vapour Retarders**

- 4.4.5.1 Self-adhesive vapour retarder membrane shall be uniformly adhered to the primed substrate.
- 4.4.5.2 Membranes with a polyethylene surface are not compatible with hot bitumen application of insulation.

4.4.5.3 Membrane side laps shall be a minimum of 75mm (3") and end laps a minimum of 150mm (6"). Offset end lap joints from adjacent rows a minimum of 300mm (12").

4.4.5.4 Apply uniform pressure over the entire membrane surface with a roller

#### **4.4.6 Self-Adhesive Modified Bituminous Membranes**

4.4.6.1 Self-adhesive modified bituminous membrane vapour retarder application without a thermal barrier shall be in compliance with the current National Building Code – Alberta Edition or Authorities Having Jurisdiction should be consulted before installation.

4.4.6.2 Membranes with a polyethylene surface are not compatible with hot bitumen application of insulation.

4.4.6.3 Membrane side laps shall be a minimum of 75mm (3") and end laps a minimum of 150mm (6") and fully supported. Offset end lap joints from adjacent rows a minimum of 300mm (12").

4.4.6.4 Apply uniform pressure over the membrane surface with a roller to enhance adhesion.

#### **4.4.7 Thermally Fused Modified Bituminous Base Sheet**

4.4.7.1 Thermally fused modified bituminous membrane vapour retarder application without a thermal barrier shall be in compliance with the current National Building Code – Alberta Edition or Authorities Having Jurisdiction should be consulted before installation.

4.4.7.2 Membrane side laps shall be fully sealed a minimum of 75mm (3") and end laps a minimum of 150mm (6") and fully supported. Offset end lap joints from adjacent rows a minimum of 300mm (12").

4.4.7.3 All end laps and side laps shall be protected.

#### **4.4.8 Polyethylene**

4.4.8.1 Membranes with a polyethylene surface are not compatible with hot bitumen application of insulation.

4.4.8.2 Membrane side laps shall be a minimum of 75mm (3") and end laps a minimum of 150mm (6"). Offset end lap joints from adjacent rows a minimum of 300mm (12"). All laps shall be sealed with a lap sealant approved by the manufacturer.

4.4.8.3 For a mechanically fastened or ballasted thermoplastic systems, the insulation shall be mechanically fastened to the structural deck over the polyethylene vapour retarder.

## **4.5 Minimum Recommended Vapour Retarders for Concrete Decks**

### **4.5.1 General**

4.5.1.1 The vapour retarder membrane shall be uniformly adhered to its substrate.

4.5.1.2 For adhered roofing systems priming of the concrete deck is recommended by ARCA to improve adhesion but is not a minimum requirement.

4.5.1.3 For high humidity conditions add a minimum of one (1) additional ply of No. 15 organic felt fully adhered into an application of hot bitumen applied at the approximate rate of 1kg/m<sup>2</sup> (20 lbs/100 sq. ft.).

### **4.5.2 Organic Felt**

4.5.2.1 Mop one ply No. 15 organic felt fully adhered to concrete deck in hot asphalt applied at the approximate rate of 1 kg/m<sup>2</sup> (20 lbs/100 sq ft).

4.5.2.2 Vapour retarder side laps shall be minimum 100mm (4") wide and end laps shall be a minimum 150 mm (6") wide.

#### **4.5.3 Kraft Laminate**

4.5.3.1 Apply one ply kraft laminate sheet adhered in a full roller coating or in continuous ribbons of vapour retarder adhesive.

4.5.3.2 Adhesive application rates shall be in accordance with adhesive manufacturer's recommended application rates. Vapour retarder adhesive is produced in both winter and summer grades, consult adhesive manufacturer for appropriate grade and application rates required.

4.5.3.3 Kraft laminate side laps shall be minimum 50mm (2") wide and end laps shall be minimum 150mm (6") wide. Laps shall be fully sealed with vapour retarder adhesive.

4.5.3.4 For fully adhered thermoplastic systems, the insulation shall be mechanically fastened to the structural deck over the Kraft laminate vapour retarder.

#### **4.5.4 Asphalt Coated Base Sheet**

4.5.4.1 Mop one (1) ply asphalt coated base sheet to concrete deck in hot asphalt applied at the approximate rate of 1 kg/m<sup>2</sup> (20 lbs/100 sq ft).

4.5.4.2 Fully sealed base sheet side laps shall be minimum 100mm (4") wide and fully sealed end laps shall be minimum 150mm (6") wide.

#### **4.5.5 Self-Adhesive Vapour Retarders**

4.5.5.1 Self-adhesive vapour retarder membrane shall be uniformly adhered to the primed substrate.

4.5.5.2 Membranes with a polyethylene surface are not compatible with hot bitumen application of insulation.

4.5.5.3 Membrane side laps shall be a minimum of 75mm (3") and end laps a minimum of 150mm (6"). Offset end lap joints from adjacent rows a minimum of 300mm (12").

4.5.5.4 Apply uniform pressure over the entire membrane surface with a roller.

#### **4.5.6 Thermally Fused Modified Bituminous Base Sheet**

4.5.6.1 Thermally fused modified bituminous membrane vapour retarder application without a thermal barrier shall be in compliance with the current National Building Code – Alberta Edition or Authorities Having Jurisdiction should be consulted before installation.

4.5.6.2 Membrane side laps shall be fully sealed a minimum of 75mm (3") and end laps a minimum of 150mm (6") and fully supported. Offset end lap joints from adjacent rows a minimum of 300mm (12").

#### **4.5.7 Polyethylene**

4.5.7.1 Membranes with a polyethylene surface are not compatible with hot bitumen application of insulation.

4.5.7.2 Membrane side laps shall be a minimum of 75mm (3") and end laps a minimum of 150mm (6"). Offset end lap joints from adjacent rows a minimum of 300mm (12"). All laps shall be sealed with a lap sealant approved by the manufacturer.

## **4.6** Minimum Recommended Vapour Retarders for Steel Decks

### **4.6.1 General**

- 4.6.1.1 The direct application of hot bitumen to steel decks is not permitted.
- 4.6.1.2 The vapour retarder membrane shall be uniformly adhered to its substrate.
- 4.6.1.3 ARCA recommends that prior to vapour retarder application that a continuous leveling surface be adhered to the steel deck such as gypsum board. The leveling surface provides support for the vapour retarder membrane, reduces deck deflection and reduces damage to the vapour retarder membrane.
- 4.6.1.4 For high humidity conditions add a minimum of one additional ply of No. 15 organic felt fully adhered into an interply application of hot bitumen applied at the approximate rate of 1 kg/m<sup>2</sup> (20 lbs/100 sq. ft). For two ply applications, the felt side laps shall be minimum 483mm (19") wide and end laps shall be minimum 150mm (6") wide.

### **4.6.2 Organic Felt**

- 4.6.2.1 For the vapour retarder, apply one ply No. 15 felt fully adhered to an ARCA approved auxiliary leveling surface in a full application of hot bitumen applied at the approximate rate of 1 kg/m<sup>2</sup> (20 lbs/100 sq ft).
- 4.6.2.2 No. 15 felt side laps shall be minimum 100mm (4") wide and end laps shall be minimum 150mm (6") wide. Laps shall be fully sealed with hot bitumen.

### **4.6.3 Kraft Laminate**

- 4.6.3.1 For the vapour retarder, apply one ply kraft laminate sheet adhered in a full roller coating or in continuous ribbons of vapour retarder adhesive applied parallel to the top flanges of the steel decking.
- 4.6.3.2 Adhesive application rates shall be in accordance with adhesive manufacturer's recommended application rates. Vapour retarder adhesive is produced in both winter and summer grades, consult adhesive manufacturer for appropriate grade and application rates required.
- 4.6.3.3 Kraft laminate side laps shall be minimum 50mm (2") wide and end laps shall be minimum 150mm (6") wide and fully supported. Laps shall be fully sealed with vapour retarder adhesive.
- 4.6.3.4 For fully adhered thermoplastic systems, the insulation shall be mechanically fastened to the structural deck over the Kraft laminate vapour retarder.

### **4.6.4 Asphalt Coated Base Sheet**

- 4.6.4.1 For the vapour retarder, nail one (1) ply asphalt coated base sheet an ARCA Approved Auxiliary Leveling Surface using large head galvanized roofing nails spaced at approximately 150mm (6") centers for laps and approximately 300mm (12") centres for field of the sheet.
- 4.6.4.2 Base sheet side laps shall be minimum 100mm (4") wide and end laps shall be minimum 150mm (6") wide and fully supported.
- 4.6.4.3 Laps shall be fully sealed with an application of hot bitumen prior to nailing.

### **4.6.5 Self-Adhesive Modified Bituminous Membrane**

- 4.6.5.1 Self-adhesive modified bituminous membrane vapour retarder application without a thermal barrier shall be in compliance with the current National Building Code – Alberta Edition or Authorities Having Jurisdiction should be consulted before installation.

- 4.6.5.2 Membranes with a polyethylene surface are not compatible with hot bitumen application of insulation.
- 4.6.5.3 Membrane side laps shall be a minimum of 75mm (3") and end laps a minimum of 150mm (6") and fully supported. Offset end lap joints from adjacent rows a minimum of 300mm (12").
- 4.6.5.4 Apply uniform pressure over the membrane surface with a roller to enhance adhesion.
  
- 4.6.6 Thermally Fused Modified Bituminous Base Sheet**
- 4.6.6.1 Thermally fused modified bituminous membrane vapour retarder application without a thermal barrier shall be in compliance with the current National Building Code – Alberta Edition or Authorities Having Jurisdiction should be consulted before installation.
- 4.6.6.2 Membrane side laps shall be fully sealed a minimum of 75mm (3") and end laps a minimum of 150mm (6") and fully supported. Offset end lap joints from adjacent rows a minimum of 300mm (12").
  
- 4.6.7 Polyethylene**
- 4.6.7.1 Membranes with a polyethylene surface are not compatible with hot bitumen application of insulation.
- 4.6.7.2 Membrane side laps shall be a minimum of 75mm (3") and end laps a minimum of 150mm (6"). Offset end lap joints from adjacent rows a minimum of 300mm (12"). End laps shall be fully supported. All laps shall be sealed with a lap sealant approved by the manufacturer.