TECHNICAL BULLETIN – TB245.001

Butynol Rubber Membrane On Concrete Roofs

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INTRODUCTION & SCOPE

Inquiries regarding the installation of Ardex Butynol Rubber Sheet Membrane over concrete roof slabs have included a number of frequently asked questions that are addressed in this bulletin. As the Butynol is an impervious membrane with a very low moisture vapour transmission rate, reference is made to the test procedures normally made for similar impervious products with low rates of moisture vapour transmission such as resilient floor coverings. This membrane is typically fixed with a contact adhesive to the prepared substrates although it may be loose laid with ballast cover to hold it in place or it may be mechanically fixed to the substrate such as when laid over contaminated surfaces.

PREPARATION

The preferred finish on new concrete is a wood float or minimal power float that does not close the surface pores/capillaries and does not result in a layer of laitance on the surface. Laitance and other contaminants on the surface are to be removed by mechanical methods such as described in ARDEX Technical Bulletin TB058. Burnished smooth and/or steel trowel finished concrete that have a “closed” surface should also be mechanically prepared for adhesive fixed membranes. Ensure all debris is removed. Ensure all holes/voids are filled with a suitable patch mortar (e.g. ARDEX B34/B36 system) and all protrusions/ sharp edges are ground flat. Allow the patch mortars to dry before proceeding.

AS4654 requires the waterproofing membrane to include upturns along all perimeters thus preparation of these vertical surfaces must also be completed. The upturns are a minimum of 100mm high although must be higher as per AS4654.2-2009 table 2.1 according to location of the site. All sheet membrane terminations are to be mechanically secured to prevent water penetrating behind the membrane upturns.

Butynol Sheet rubber membranes can be applied to flat roofs although the preferred installation is over substrates that have sufficient fall to prevent the ponding of water on the surface. Surface water may be directed to floor wastes penetrating the roof or to box gutters lined with the same membrane system.

The Butynol sheet rubber membrane can be applied over existing compatible membranes although it is always best to remove loose/flaking material and all bituminous products. Where removal of existing incompatible material is not possible, an intermediate layer such as the Ardex HD Cover board can be mechanically fixed to form a new substrate for the Butynol membrane.

MOISTURE CONTENT

This is one of the most critical issues as excess residual moisture in the concrete substrate can lead to

- Bubbling/ blistering of the membrane with the potential for wind uplift lifting the membrane off the roof.
- Degradation of the membrane adhesive requiring removal.
- Potential for mould/fungi growth under the membrane, particularly at membrane terminations around HVAC equipment.

Bubbling &/or blistering of waterproofing membranes is indicative of moisture vapour between the membrane and the substrate. The bubbles may enlarge during the hot part of the day and virtually disappear at night and the membrane may remain intact with no leaks. However the membrane has lost adhesion and the adhesive is being exposed to moisture that will eventually adversely affect the entire membrane installation. In geographical locations subject to cyclonic conditions, high wind uplift may remove the unbonded membrane

In general terms, only about one third of the water added to the concrete is required for reaction with the cement. The additional water is added to create a plastic mortar that can be easily worked into the formwork shapes on site. This additional water then has to escape for the concrete to develop its design strength. Moisture loss is mostly by evaporation and the rate of evaporation is generally controlled by the application of curing compounds. These compounds reduce the rate of moisture loss and help limit cracking of the concrete. A rough guide is that concrete will dry at a rate of approximately 1 day per millimetre slab thickness with the recommended moisture content to be around 5% prior to the installation of impervious membranes. This means a 100mm thick reinforced concrete slab will require approximately 100 days drying time with no rain episodes during that drying period. In the event that adequate drying will be not achieved, the decision regarding new concrete is simple in that a moisture barrier able to resist hydrostatic pressure must be applied to prevent the residual moisture affecting the membrane. For aged concrete it is harder to assess and the procedure can be to conduct a moisture test based on the recommendations of AS1884-2012. Testing to this standard requires the result to show less than 75% relative humidity at 40% slab thickness.

The Ardex WPM300 two part water borne epoxy is the preferred moisture barrier for concrete roofs to which the membrane will be fixed with adhesive. This is applied at not more than 3 sqm per litre per coat – two coats with at least 4 hours drying between coats can be applied although this dependent upon the age of the concrete. This product can be applied as the curing compound as soon as the concrete is hard enough to walk over. Allow the moisture barrier to dry for at least 72 hours to develop scratch resistance prior to installation of the membrane.
An alternate solution is to provide venting at the high points of the roof to allow the moisture vapour to escape from under loose laid and/or mechanically fixed Butynol sheet rubber roof membranes. Prefabricated vents are available for Butynol membrane systems.

CURING COMPOUNDS

The standard method of preventing rapid moisture loss from new concrete is to apply curing compounds soon after the concrete has hardened enough to walk over. Curing compounds can be variable in formulation and can affect the adhesion of the Butynol membrane. Incompatible (e.g. oil based) curing compounds must be removed by mechanical means to achieve the open pored surface recommended for maximum adhesion of the moisture barrier and/or contact adhesive for the membrane.

CONDENSATION

There is a growing awareness that in many new residential buildings, condensate is appearing inside under the roof structure.
There are many possible reasons for this including lack of adequate ventilation under the roof, effective roof insulation systems, high humidity climatic conditions combined high occupancy rates and perhaps the effects of constant air-conditioning chilling the internal structure. Add to this an impervious roof membrane and the need for a moisture barrier to prevent moisture vapour migrating through the pores and micro-cracks in the roof adversely affecting the adhesive-fixed membrane is more apparent.

BUTYNOL MEMBRANE INSTALLATION

The Butynol sheet rubber membrane is a permanently flexible sheet membrane that is stable in fully exposed conditions and has a very low moisture vapour transmission.

It can be applied over new and old concrete roof surfaces. The preferred installation as a fully bonded system is as briefly described follows;

- Mechanically prepare the surface to remove contaminants such as laitance, curing compounds and/or old membrane materials. Include preparation of adjacent perimeter walls where the membrane upturns will terminate.
- Complete a moisture content test if required *or*
- Apply the Ardex WPM300 at not more than 3 sqm per litre per coat. New concrete may require 2 coats while aged concrete may only require one coat. Allow the moisture barrier to dry (24 -72 hours) to achieve scratch resistance. Let dry.
- Apply the Butynol detail flashings and cove fillets to internal corners/penetrations through the roof and waste outlets/scuppers where required.
- Unroll the Butynol membrane sheets in the positions they will be fixed with the sheet overlaps of 50mm. Allow these sheets to "relax" for 20-30 minutes prior to fixing.
- Fold each sheet in half lengthways to expose the substrate and the back half of the folded sheet.
- Apply the Ardex Butynol using the Ardex WA98 Solvent based contact adhesive or the ARDEX Water based contact adhesive to the substrate and the folded back half roll of Butynol. These adhesives may be applied by brush, roller or spray techniques.
- Allow the adhesive to "tack dry" and then work the folded half sheet back over the adhesive covered substrate taking care to prevent bubbling/creasing. The sheet membrane must not be stretched into position.
- All sheet overlaps are joined using the Ardex Seam Tape after scrubbing both top & bottom surfaces with Ardex Seam Primer.

The Ardex Butynol Sheet Membrane may also be mechanically fixed using a variety of fixings according to the substrate type. In concrete the most common type are flat plates fixed with hammer screw anchors at regular intervals. Wind uplift calculations by qualified engineers may be required to determine the spacing of the fixing anchors.

SUMMARY

The Butynol Sheet Rubber membrane is a versatile membrane that has traditionally been adhesive fixed over plywood substrates. However it is one of the oldest synthetic membranes (over 50 years) with a history of applications as a fully exposed roofing membrane that is UV stable, flexible in both extreme cold (e.g. Antarctica) and tropical (e.g. Fiji Islands) locations and suitability of use as a "green roof" membrane under landscaping. It is also suitable for use over concrete substrates. This article describes the installation of this membrane over concrete with regards to achieving a finish free of bubbling/blistering that can also occur in both fully bonded sheet and/or liquid applied membranes.

IMPORTANT

This Technical Bulletin provides guideline information only and is not intended to be interpreted as a general specification for the application/installation of the products described. Since each project potentially differs in exposure/condition specific recommendations may vary from the information contained herein. For recommendations for specific applications/installations contact your nearest Ardex Australia Office.

DISCLAIMER

The information presented in this Technical Bulletin is to the best of our knowledge true and accurate. No warranty is implied or given as to its completeness or accuracy in describing the performance or suitability of a product for a particular application. Users are asked to check that the literature in their possession is the latest issue.

REASON FOR REVISION

DOCUMENT REVIEW REQUIRED

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