



## TECHNICAL BULLETIN – TB245

# BUTYNOL RUBBER MEMBRANE ON CONCRETE ROOFS

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### INTRODUCTION & SCOPE

Inquiries regarding installing ARDEX Butynol Rubber Sheet Membrane over concrete roof slabs include several 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 moisture vapor transmission rates such as resilient floor coverings. This membrane is typically bonded with a contact adhesive to the prepared substrates. However, it may be loosely laid with a 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. Burnished smooth and/or steel trowel-finished concrete with 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 BR345) 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 so preparation of these vertical surfaces must also be completed. The upturns are a minimum of 100mm high, although they may need to be higher depending on location. Refer to the latest version of AS4654.2. All sheet membrane terminations must be mechanically secured to prevent water from penetrating behind the membrane upturns.

ARDEX Butynol Sheet is installed on roofs in accordance with AS4654.2, with sufficient falls to prevent water ponding on the surface. Surface water may be directed to floor wastes penetrating the roof or box gutters lined with the same membrane system.

ARDEX Butynol sheet rubber membrane can be applied over existing compatible membranes, although removing loose/flaking material and all bituminous products is always best. Where removing incompatible material is impossible, an intermediate layer, such as a Protection Board, can be mechanically fixed to form a new substrate for the ARDEX 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 indicates 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 exposed to moisture that will adversely affect the 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 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 extra water must then 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 millimeter of slab thickness, with the recommended moisture content to be around 5% before the installation of impervious membranes. This means a 100mm thick reinforced concrete slab will require approximately 100 days of drying time with no rain episodes during that drying period. In the event that adequate drying will not be achieved, the decision regarding new concrete is simple: a moisture barrier able to resist hydrostatic pressure must be applied to prevent residual moisture from 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. Testing to this standard requires the result to show less than 75% relative humidity at 40% slab thickness.

ARDEX WPM300 two-part waterborne 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 3m<sup>2</sup> per litre per coat in two coats with at least 4 hours drying between coats. 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 may 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 condensate is appearing inside many new residential buildings under the roof structure.

There are many possible reasons, including lack of adequate ventilation under the roof, effective roof insulation systems, high humidity climatic conditions combined with high occupancy rates, and 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 from migrating through the pores and micro-cracks in the roof adversely affecting the adhesive-fixed membrane is more apparent.

## BUTYNOL MEMBRANE INSTALLATION

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 is a fully bonded system with installation described as 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 ARDEX WPM300 at not more than 3m<sup>2</sup> 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 50 mm sheet overlaps. Allow these sheets to “relax” for 20-30 minutes before fixing.
- Fold each sheet in half lengthways to expose the substrate and the back half of the folded sheet.
- Apply ARDEX Butynol using the ARDEX WA98 solvent-based contact adhesive to the substrate and the folded-back half roll of Butynol. This adhesive 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 ARDEX Seam Tape after scrubbing both top & bottom surfaces with ARDEX Seam Primer.

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

ARDEX Butynol Sheet Rubber membrane is a versatile membrane traditionally adhesive-fixed over plywood substrates. 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 and flexible in both extreme cold (e.g., Antarctica) and tropical (e.g., Fiji Islands) locations. It is suitable as a “green roof” membrane under landscaping. It is also suitable for use over concrete substrates. This bulletin describes the installation of this membrane over concrete to achieve a finish free of bubbling/blistering that can also occur in both fully bonded sheet and/or liquid-applied membranes.



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**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.

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