

Membranes do matter

Specifying and detailing a roof, deck or basement waterproofing membrane is not an area to cut corners.

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THE BUILDING CODE requires that building materials and components are durable and that external and internal water is managed so it does not damage the structural integrity of the building or impact on the health of the occupants.

Membrane use and function

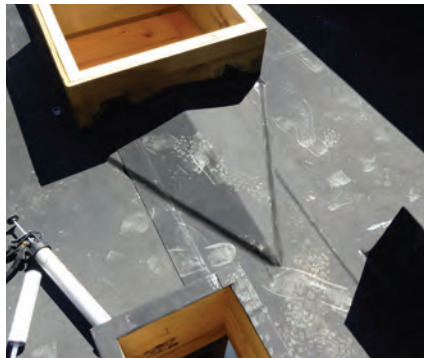
Membranes used to waterproof roofs, decks, basements and internal wet areas must be designed and installed to manage water and protect from water damage. Membranes are designed to prevent the transmission of water and to keep the structure they are protecting dry.

For roofs, decks and basements, membranes keep out water, while for internal wet areas, the membrane is there to contain any water getting past the applied finish such as tiles and affecting adjacent spaces to the wet area.

Roofing membranes

In New Zealand, roofing membranes are commonly:

- torch-on modified bitumen laid in two layers and incorporating a cap layer or applied finish to protect the bitumen surface from UV
- single-layer butyl rubber or EPDM
- multi-coat liquid-applied acrylic or polyurethane system
- TPO (thermoplastic polyolefin) - a single



layer adhered system with heat-welded joints

- PVC - a single-layer adhered system with heat-welded joints.

Membrane roofing systems can be used to cover very large roof areas or complex roof shapes, have a low-profile finish, can be used for gutters and can be laid to lower falls than most other roofing materials.

Roofs designed to E2/AS1 must have a minimum fall of 2°. BRANZ recommends a minimum 3° fall so that, over the life of the building, the fall will be maintained and not be compromised by any sagging in the roof or construction inaccuracy.

A number of building consent authorities (BCAs) ask for greater falls based on their experience with low-slope roofs, so check with your local BCA before finalising your design. E2/AS1 only covers butyl rubber or EPDM membranes at least 1 mm thick. Other membrane roofing systems must be

submitted for consent, with supporting information on performance and durability, as an alternative method.

Roofing membranes can also be used to waterproof car decks, warm roofs, green roofs and internal gutters even if the roofing material is not of the same material, for example, a long-run metal roof draining into a membrane gutter.

Decking membranes

Decking membranes can be torch-on modified bitumen, PVC, butyl/EPDM or a liquid-applied system. Decks designed to E2/AS1 must be laid to a minimum 1.5° fall. Again, BRANZ recommends a minimum fall of 3°. E2/AS1 only covers butyl rubber or EPDM deck membranes at least 1.5 mm thick. Under E2/AS1, directly applied wearing or decorative surfaces are outside the scope.

Any walk-on surface should be removable to allow for membrane inspection and maintenance.

As with roofs, other membrane decking systems must be submitted for consent, with supporting information as to performance and durability, as an alternative method. Options for removable surfaces that also protect the membrane from damage include timber slat decking panels or floating paver tiles supported on height-adjustable chairs.

PVC, butyl rubber, EPDM and some liquid-applied membranes may be used

unprotected in trafficable areas. Where a torch-on modified bitumen membrane is to be used on a trafficable surface, contact the membrane supplier for specific detailing and installation requirements to provide a suitable trafficable surface.

Basement wall waterproofing

Below-ground waterproofing membranes not subject to hydrostatic water pressure (DPMs), can be torch-on modified bitumen, a peel and stick composite (such as a polymer-modified rubber bitumen) or a liquid-applied membrane.

The material, design and installation are critical, as waterproofing membranes below ground require a 100% success rate. Basement waterproofing is very difficult to repair or replace once the building has been completed.

The critical areas of detailing and installation are:

- maintaining the integrity of the waterproofing at the junction between a slab vapour barrier and the wall waterproofing - this is a difficult area as it is often constricted and dirty, and the two waterproofing systems need to be able to be sealed together
- ensuring the substrate is clean and dry
- detailing the termination of the membrane at the top and sides of the wall to stop water getting behind the protection
- protecting the installed waterproofing membrane from damage.

Internal wet area membranes

Internal wet area membranes are designed for use under a stone or ceramic-tiled finish so that water absorbed by the grout or tiles is prevented from being transferred to or absorbed by adjacent dry parts of the building. The most common membrane used is a liquid-applied acrylic, typically reinforced. Key requirements are:

- compatibility with the adhesive or grout
- achieving the required dry film thickness
- ensuring the reinforcing is fully embedded

in the membrane

- allowing each coat to dry or cure properly before applying the next coat or tiling over.

Dealing with the substrate

Plywood is the most common roof and deck substrate, but compressed fibre-cement sheet or concrete are used. Correct substrate specification, detailing and installation are critical to membrane performance:

- The face of the substrate must be clean and dry to ensure good adhesion of the membrane.
- Concrete surfaces must have all additives or release agents removed and be ground smooth if required.
- Plywood should be at least 17 mm thick, CD-faced (with C face upwards) H3 CCA-treated, screw-fixed and laid with face grain at a right angle to the main support framing.
- All sheet edges must be supported - E2/E2/AS1 specifies main support members at 400 mm maximum centres.
- The supporting structure and substrate must be within the deflection limit of the relevant standards (NZS 3604 for timber) to reduce deflection.

Substrates require chamfered edges at downturns and angle fillets at upturns.

Membrane installation is critical

The supplier's specific installation requirements for corners (the pig's ear detail for flexible sheet membrane such as butyl), side laps where sheets are lapped, brick-bonding of multiple sheets, upturns and downturns at the roof or deck perimeter, curing or drying time for liquid-applied membranes, spread rate and tack time for adhesives and dry film thickness for liquid-applied systems must be understood and followed by the installer.

Consider the following:

- Are the weather conditions suitable for application and curing? Wind can make installation of sheet membranes challenging.

- Can the correct upturn behind the cladding or flashing, 150 mm in E2/AS1, be achieved?
- Can an internal membrane gutter be laid without cross joints as specified in E2/AS1?
- Are sufficient upstands able to be formed around rooflights and other large roof penetrations?
- Can the supplier's recommended roof vents be incorporated?

Suppliers, warranties and applicators

As with most building products, membranes are continually being developed.

Before specifying any membrane ask a membrane supplier to determine the best membrane system for the intended use. Don't guess or choose the lowest-cost component as failures result in far greater cost than getting the selection and installation right in the first place.

Membrane suppliers will give warranties, but only if they are given full information before it is applied so that they:

- can ensure the optimum product has been specified for the required purpose
 - know the installer is appropriately trained
 - have seen the construction drawings or specification
 - have inspected the completed installation.
- All membrane suppliers train and license applicators in the installation of specific membrane types. Check whether the applicator had the correct training, for example, a torch-on applicator may not be trained to apply an internal wet area membrane.

Specifier beware

Waterproofing should not be skimmed on in any building project, as the cost, time and hassle factor can be very prohibitive if subsequent remedial work or full replacement of the membrane is required.

Choosing the right membrane and getting expert advice go a long way to preventing future problems. ◀

For more ▶ The Waterproof Membrane Association website www.membrane.org.nz has published a code of practice for torch-on membranes.