

**Standard Detail for Membrane
Application as per Department Of
Building & Housing E2-AS1**

8.5 Membrane Roofs and Decks

8.5.1 Limitations

This Acceptable Solution is limited to *membranes* composed of butyl or EPDM installed over plywood substrates for:

- a) Roofs with a minimum fall of 1.5° (1:40),
- b) *Decks* with:
 - i) a minimum fall of 1° (1:60),
 - ii) a maximum area of 40 m²,
 - iii) no steps in level within *deck* area except into gutters,
 - iv) no integral roof gardens, and
 - v) no downpipe direct discharge to *deck*,

COMMENT:

Discharging gutters directly onto *decks* increases the chances of water entry into sensitive areas.

Direct discharge may be allowed into gutters calculated to have sufficient water-carrying capacity, but this is outside the scope of this Acceptable Solution.

- c) Internal gutters with a minimum fall of 1 in 100, with no seams in the gutters closer than 1 m to an outlet, and

COMMENT:

Seams should be avoided in gutters where possible. Where they cannot be avoided they should be positioned at a high point or a change in plane to reduce the risks of ponding on the seam. Seams in gutters are particularly difficult to form at outlets through *enclosed balustrade* walls, and the risk of failure is high. Failure of a seam can result in damage to underlying walls.

- d) *Decks* with removable raised surfaces to give level access as shown in Figure 17A.

The application of directly-applied wearing or decorative surfaces to *membranes* is not covered in this Acceptable Solution.

COMMENT:

EPDM and butyl rubber *membranes* are subject to damage when on trafficable *roof-decks*. A suitable wearing surface will help reduce such damage.

8.5.2 General

COMMENT:

It is recommended that installation of membrane *cladding* be by trained installers, approved by the manufacturer or the NZ agent (in the case of imported membrane).

Amend 2
Jul 2005

8.5.3 Plywood substrates

Plywood shall be:

- a) A minimum of 17 mm complying with AS/NZS 2269,
- b) At least CD Grade Structural plywood with the sanded C face upwards, and
- c) H3 with treatment type compatible with *membrane* and adhesives used, and kiln dried after treatment.

Amend 2
Jul 2005

COMMENT:

The compatibility of LOSP-treated plywood must be checked with *membrane* suppliers.

If using plywood containing copper-based preservatives, check the compatibility of adhesives and *membranes* with copper with the product manufacturers.

8.5.4 Butyl and EPDM

Butyl rubber and EPDM rubber used for *membrane* roofing or *decks* shall:

- a) Be a minimum thickness of:
 - i) 1 mm for roofing, or
 - ii) 1.5 mm for decks, and
- b) Comply with the following parts of Table 1 in ASTM D6134:
 - i) tensile strength,
 - ii) elongation,
 - iii) water absorption,
 - iv) water vapour permeance, and
 - v) heat aging followed by:
 - a. tensile strength
 - b. elongation, and
- c) Have adhesives, primers and seam tapes that:
 - i) comply with BRANZ EM 5, and
 - ii) are part of a complete system approved by the manufacturer or supplier of the *membrane*.

Amend 2
Jul 2005

8.5.5 Installation

8.5.5.1 Plywood

Substrates must be dry when *membranes* are applied. The plywood and the timber substructure shall have a maximum moisture content of 20% when a *membrane* is adhered.

Amend 2
Jul 2005

Amend 2
Jul 2005

COMMENT:

This will generally require substrates to be covered to prevent rain wetting, or to be pre-primed to avoid moisture uptake.

Manufacturers' recommendations should be consulted, as some require a lower moisture content in order to validate guarantees.

Plywood substrates shall be fixed according to the following requirements:

- a) Panels shall be laid with staggered joints (brick bond),
- b) The edge of sheets shall be supported with *dwangs* or *framing*, unless a structurally tested tongue-in-groove edge provides equivalent support,
- c) The maximum span shall be 400 mm,
- d) Plywood shall be laid with the face grain at right angles to the supports,
- e) A 20 mm triangular fillet shall be used at the base of any 90° upstand,
- f) External edges shall be chamfered with a minimum radius of 5 mm, and
- g) Plywood shall be fixed:
 - i) with 10 g x 50 mm stainless steel countersunk head screws,
 - ii) with 3 mm gaps between all sheets,
 - iii) at 150 mm centres on edges, and
 - iv) 200 mm in the body of the sheets.

Amend 2
Jul 2005

COMMENT:

Closed-in construction spaces under *membrane* roofs and *decks* shall have adequate ventilation to prevent the accumulation of moisture under the *membrane*. There should be a minimum gap of 20 mm between the underside of the substrate and any insulation.

For roof or *deck* areas over 40 m², roof vents will be required. Roof vents are not covered by this Acceptable Solution.

8.5.5.2 Butyl and EPDM

Seam tapes shall be used on all joints of:

- a) Roofs or *decks* with falls less than 5° (1:12),
- b) Gutters or where water could pond,
- c) Penetrations through the *membrane* where butyl or EPDM *flashing* is required,
- d) EPDM *membrane*, and
- e) Butyl *membranes* that contain EPDM.

COMMENT:

Coloured butyl *membranes* contain EPDM, which makes them more difficult to adhere properly.

Seams should be aligned parallel to the fall of the *deck* to minimise ponding. The use of joints in butyl or EPDM should be avoided in gutters. Where this is not possible, the plywood should be rebated to minimise the effect of the seam.

Where a penetration is made through the *membrane* subsequent to laying, the *flashing* should be installed by the applicator of the *membrane* system.

All joints in the plywood and junctions of plywood with other materials shall have 25 mm polyethylene release tape applied before application of the *membrane*.

8.5.6 Roof and deck drainage

Roofs and *decks* shall be *constructed* to provide falls as shown in Figure 56.

Roofs and *decks* shall be *constructed* so that:

- a) The highest point of the roof or *deck* is a minimum of 100 mm below an adjoining floor as shown in Figure 62,
- b) *Membrane* upstands extend to a minimum level of 50 mm above the floor level at all walls or *parapets* as shown in Figure 62,

Amend 2
Jul 2005

COMMENT:

This will lead to a minimum total *membrane* upstand of 150 mm which, if the clearance of the *cladding* from the *deck* or roof surface is at the minimum of 35 mm, gives an overlap of 115 mm.

- c) Water discharges either:
 - i) directly into roof outlets with a minimum diameter of 75 mm as shown in Figure 64, or
 - ii) via *scupper* openings, into a rainwater head, or a gutter with a minimum width of 300 mm as shown in Figure 63,
- d) Where the discharge is through a *parapet* or *enclosed balustrade*, the *scupper* opening shall have a minimum clear opening of 200 mm wide and 75 mm high, with a lip as shown in Figure 63,
- e) External corner upstands in the *membrane* around the *scupper* opening are formed as shown in Figure 57, and

COMMENT:

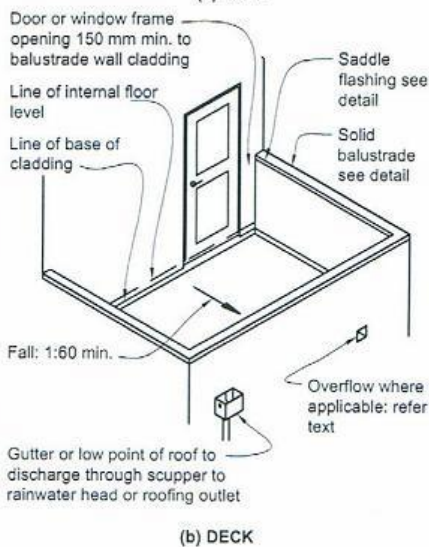
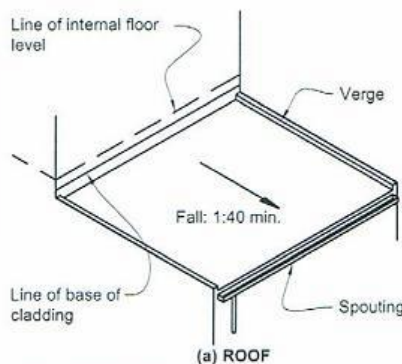
Refer to E1/AS1 for specific drainage requirements, as minimum sizes for outlets and gutters may be higher than shown in this Acceptable Solution.

- f) When an internal outlet is used, allowance for additional run-off shall be provided by:
 - i) an overflow in addition to the outlet, or
 - ii) an extra outlet, with both outlets sized to take the full required capacity.

When an overflow is provided in addition to the outlet, a lip to the overflow shall be formed as shown in Figure 63.

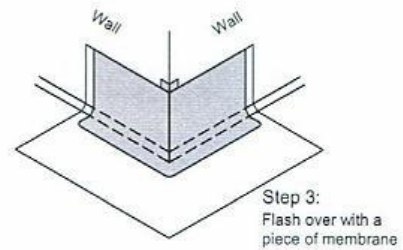
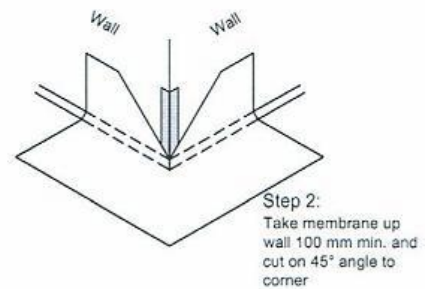
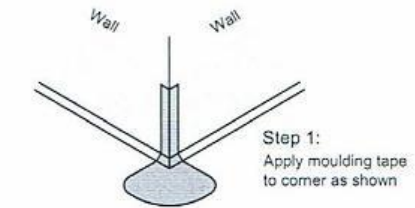
Figure 56: Falls in membrane roofs and decks
Paragraphs 8.5.6 and 8.5.6 a)

NOTE: (1) Refer Figure 62 for thresholds and clearances.
(2) Junction saddle flashing – refer Figure 13.



Amend 2
Jul 2005

Figure 57: External corner in upstand
Paragraphs 8.5.6 e) and 8.5.8 a),
Figures 59 and 63



8.5.7 Control joints

All *control joints* in the substrate shall be accommodated in the *membrane* roof design.

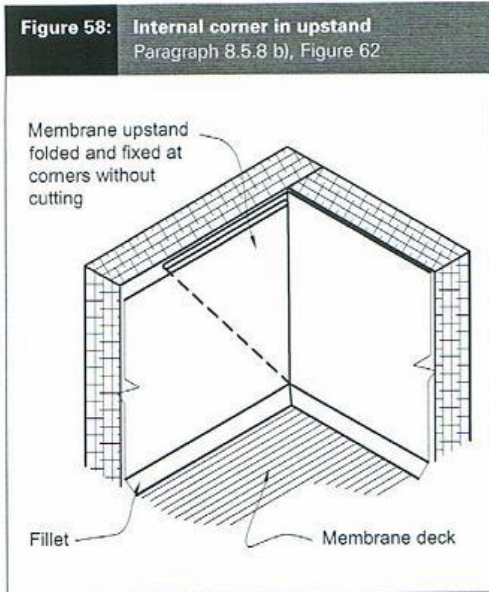
The design of *control joints* for *membrane* roofing is subject to *specific design* and is outside the scope of this Acceptable Solution.

Amend 2
Jul 2005

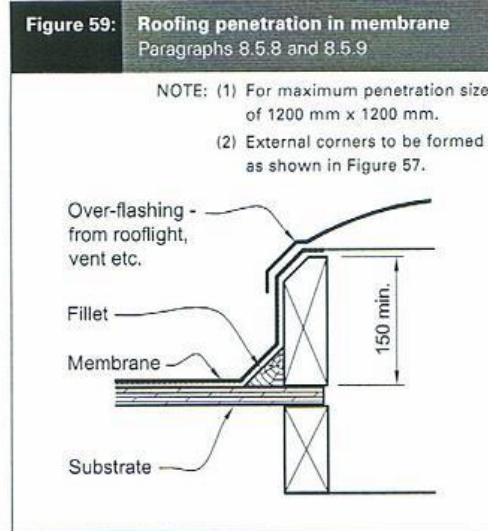
8.5.8 Junctions

All junctions of roof or *deck* to walls, *parapets* and *enclosed balustrades* shall be made *weathertight* using the following appropriate details:

- a) Figure 57: External corner in upstands,
- b) Figure 58: Internal corner in upstands,
- c) Figure 61: Verges and eaves,



Amend 2
Jul 2005



- d) Figure 62: Junctions of *decks* and walls, and
- e) Figure 63: *Scupper* discharge from a roof to a rainwater head and the weatherproofing of the opening.

8.5.8.1 Junctions with walls

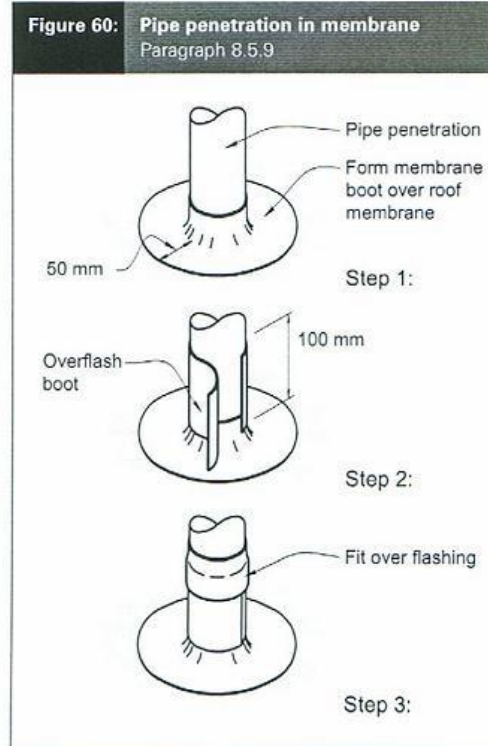
Junctions of *membrane decks* or walls shall be formed as shown in Figure 62.

Clearances in Figure 62 are shown to the *membrane* surface. Where there is an additional material applied over the *membrane*, all required clearances shall apply to the highest level of the upper wearing surface, where this is also the draining surface.

The bottom of the wall *cladding* above the *deck* or roof surface shall be sealed prior to fixing.

COMMENT:

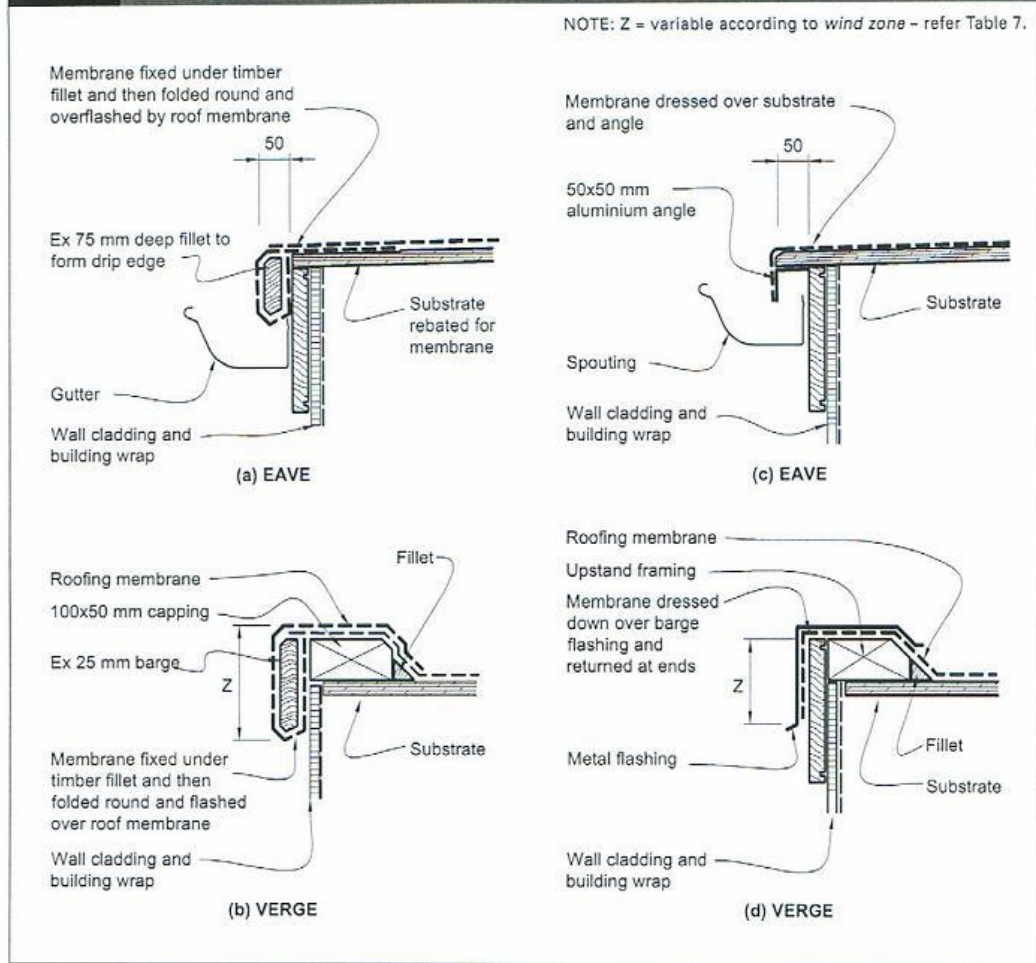
Adding wearing surfaces such as tiles over the *membrane* will effectively reduce clearances, and should be allowed for when setting *membrane* levels.



8.5.9 Penetrations

Penetrations through *membrane* roofs and *decks* shall be as shown in Figure 59 and Figure 60.

Figure 61: Verges in membrane
Paragraph 8.5.8 c)



Amend 2
Jul 2005

Amend 2
Jul 2005

8.5.9.1 Handrails

Fixing of posts for *handrails* into *membrane* roofs or *decks* is not covered by this Acceptable Solution.

COMMENT:

Any fixing of posts into *membrane* roofs or *decks* will require *specific design*.

The fixing of posts into tiles over a *membrane* is particularly risky, and should be avoided.

8.5.10 Gutters

Deck gutters and internal outlets shall be *constructed* as shown in Figure 64.

COMMENT:

Internal outlets should have a dome-type cover to reduce risk of blockage, except where this could constitute a pedestrian hazard.

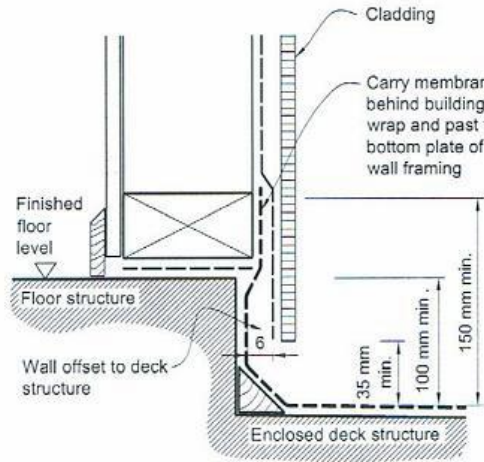
When an overflow is provided for roofs or *enclosed decks* as per Paragraph 8.5.6 f) i), the overflow shall have a cross-sectional area equal to 1.5 times the cross-sectional area of the calculated discharge downpipe.

Any plywood adjacent to *deck* gutters shall be treated to H3.1, and protected from water splash.

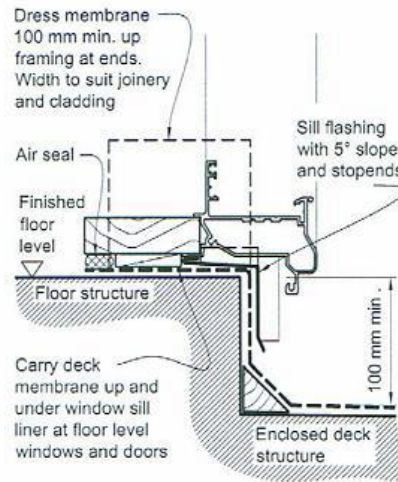
Amend 2
Jul 2005

Figure 62: Junctions with walls for membrane
 Paragraphs 7.4.3, 8.5.6 b), 8.5.8 d) and 8.5.8.1

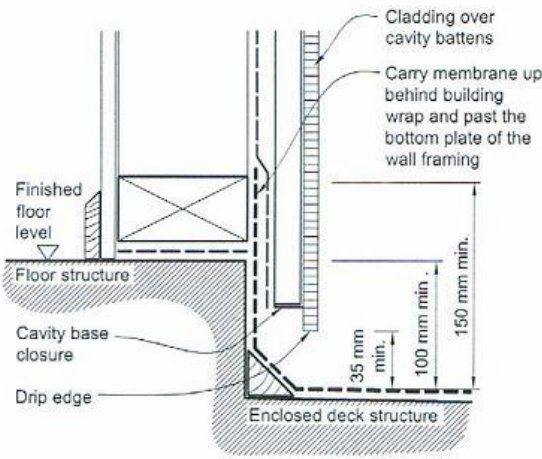
NOTE: (1) Internal corners to be formed as shown in Figure 58.
 (2) Dimensions are shown to *membrane*. However, where there is an additional material applied over the *membrane*, all dimensions shall apply to the highest level of the wearing surface.



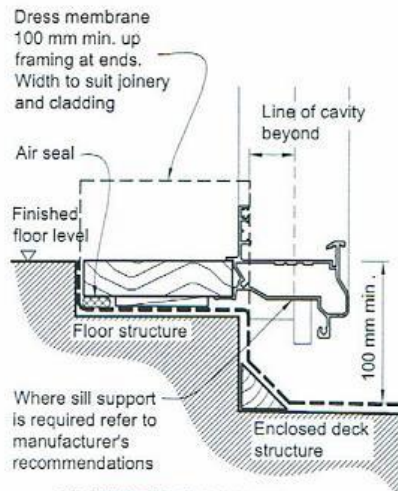
(a) DIRECT FIX THRESHOLD AT WALL



(b) DIRECT FIX THRESHOLD AT OPENING



(c) CAVITY THRESHOLD AT WALL



(d) ALTERNATIVE CAVITY THRESHOLD AT OPENING

Amend 2
 Jul 2005

Amend 2
 Jul 2005

Figure 63: Rainwater head and scupper opening in membrane
 Paragraphs 8.5.6 d) and f)

NOTE: (1) A preformed scupper unit may be used, but this will require specific design.
 (2) External corners of scupper opening to be formed as shown in Figure 57.

Amend 2
 Jul 2005

