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for

AS 4654.2-2012 Waterproofing membranes for external above-ground use - Design and installation

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Australian Standard®

Waterproofing membranes for external above-ground use

Part 2: Design and installation

This Australian Standard® was prepared by Committee BD-013, External Waterproofing Membranes. It was approved on behalf of the Council of Standards Australia on 2 July 2012. This Standard was published on 14 September 2012.

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- Australian Building Codes Board
- Australian Chamber of Commerce and Industry
- Australian Institute of Waterproofing
- Australian Tile Council
- CSIRO Manufacturing and Infrastructure Technology
- Housing Industry Association
- Importers Distributors and Sealants Manufacturers Association of Australia
- Master Builders Australia
- South Australian Housing Trust
- TAFE NSW

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Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

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Australian Standard®

Waterproofing membranes for external above-ground use

Part 2: Design and installation

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PREFACE

This Standard was prepared by the Standards Australia Committee BD-013, External Waterproofing Membranes, to supersede AS 4654.2—2009 *Waterproofing membrane systems for exterior use—Above ground level,* Part 2: *Design and installation.*

This Standard has been prepared in response to numerous requests from industry representatives in the field of external waterproofing, especially in the areas of roofs, decks and balconies.

The objective of this Standard is to provide a consistent and reliable approach to the design and installation of external waterproofing membrane systems.

The objective of this revision is to align this Standard with the protocols and requirements as set out by the Australian Building Codes Board (ABCB).

This Standard is Part 2 of a series of Standards on external waterproofing, as follows:

AS	
4654	Waterproofing membranes for external above-ground use
4654.1	Part 1: Materials
4654.2	Part 2: Design and installation (this Standard)

Figures throughout this Standard indicate the membrane system as a heavy dashed layer line. The system may comprise a single layer or multiple layers.

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

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STANDARDS AUSTRALIA

Australian Standard
Waterproofing membranes for external above-ground use

Part 2: Design and installation

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard sets out requirements for the design and installation of above-ground external waterproofing membranes for use in buildings and structures (for example roofs and balconies).

The waterproofing membranes covered by this Standard are also suitable for landscaped areas.

This Standard is not intended for use in applications such as structures below ground level, swimming pools and spas. It excludes concrete admixtures or penetrant sealers and decorative coatings.

1.2 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard:

NOTE: Documents referenced for informative purposes are listed in the Bibliography.

AS
4654 Waterproofing membranes for external above-ground use.
4654.1 Part 1: Materials

1.3 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

1.3.1 Bioresistance

Resistance to degradation by biological attack.

1.3.2 Collar

A device to seal a sleeve to the substrate.

1.3.3 Drainage cell

A durable material used to overlay the membrane to protect it from physical damage and allow the transfer of moisture to relieve hydrostatic pressure.

NOTE: Timber and timber-based products are not acceptable for use as drainage cells.

1.3.4 External waterproofing membrane systems

A combination of membrane-associated products used in the membrane's installation such as primers, mechanical fasteners, waste outlets and flashings that form a waterproof barrier.

1.3.5 Fillet

A triangular or curved profile used at internal intersections to assist the membrane to accommodate the transition from horizontal to vertical surfaces.

1.3.6 Membrane

An impervious barrier to liquid or water, which can be sheet or liquid applied.

NOTE: A membrane can have many parts but only one layer.

1.3.7 Potable water

Water that is suitable for human consumption, food preparation, utensil washing and oral hygiene. Sometimes referred to as drinking water.

NOTE: For the testing of products for use in contact with drinking water, see AS/NZS 4020.

1.3.8 Pressure seal

A durable, mechanical fastening system that applies even pressure to the exposed edge of the membrane to prevent deformation of the flashing or the pressure seal, which has a profile suitable for the application of a gasket seal between the pressure seal and the substrate.

1.3.9 Protection board

A durable material used to overlay the membrane to protect it from physical damage.

NOTE: Timber and timber-based products are not acceptable for use as protection board material.

1.3.10 Root-resistant

Capable of preventing root penetration through a membrane.

1.3.11 Screed

A layer of material (usually cement based) of defined minimum thickness, which sets in situ and which may be interposed between the structural substrate and bedded finish.

1.3.12 Sleeve

A device secured to the substrate to allow the penetrating service (e.g., pipe or duct) to move independently of the substrate.

1.3.13 Substrate

A surface to which a material or product is applied.

1.3.14 Trafficable surface

NOTE: For slip-resistance of trafficable surfaces, see AS/NZS 4586.

1.3.14.1 *Trafficable surface, maintenance*

Surface that is intended to withstand traffic experienced during maintenance procedures.

1.3.14.2 *Trafficable surface, pedestrian*

Surface that is intended to withstand pedestrian traffic.

1.3.14.3 *Trafficable surface, vehicular*

Surface that is intended to withstand vehicular traffic.

1.3.15 Waterproof

The property of a material that does not allow moisture to penetrate through it when tested in accordance with AS 4654.1.

1.4 MEMBRANE SYSTEMS

Membrane systems are classified into five main groups as follows:

(a) *Ballasted membranes* Membrane systems that are held down by ballast or other finish.

(b) *Fully bonded membranes* Systems that are fully bonded to the substrate; include liquid membrane systems.

(c) *Inverted roof membrane assembly (IRMA)* System where the ballasted roof insulation is placed on top of the membrane.

(d) *Mechanically fixed membranes* Membrane systems that are held down by mechanical fastening.

(e) *Partially bonded membranes* Systems where only part of the surface area of the membrane is designed to be bonded to the substrate.

1.5 EXPOSED AND PROTECTED SYSTEMS

The membrane and system types listed in Clause 1.6 shall be either exposed or protected, as follows:

(a) *Exposed systems* Systems designed to be exposed to the weather and/or mechanical and/or chemical damage.

(b) *Protected systems* Systems designed to be protected from the weather and mechanical and chemical damage.

1.6 CONFORMANCE CONDITIONS

Materials used in the design and installation of waterproofing membranes for external above-ground use shall comply with AS 4654.1.

NOTE: Manufacturers making a statement of compliance with this Australian Standard on a product, or on a packaging or promotional material related to that product, are advised to ensure that such compliance is capable of being verified.

Each membrane shall pass the appropriate test of the service conditions to which it will be exposed.

SECTION 2 DESIGN AND INSTALLATION

2.1 GENERAL

Membrane systems shall be designed and installed as appropriate for their intended application.

NOTE: The details illustrated in the figures of this Section are typical acceptable methods and are not to be interpreted as precluding the use of other methods.

2.2 PREVENTION OF DAMAGE

Where the waterproofing system is to come in contact with root systems of vegetation, it shall be root resistant.

Causes of damage to waterproofing membranes include, but are not limited to, the following:

(a) Abrasion (see Note 1).

(b) Exposure to ultraviolet light.

(c) Attack from plant roots.

(d) Installation of overlay materials and any subsequent movement of overlay materials.

(e) Birds, pests and wildlife attack.

(f) Differential movement of structural elements of a building.

(g) Substrate failure.

(h) Moisture.

NOTES:

1 For abrasion resistance, see AS 4654.1.

2 Moisture behind the membrane will cause failure and reduce the life of the membrane by blistering and delamination from the structure.

2.3 MOVEMENT

The design and installation of a waterproofing membrane system shall be Class I, Class II or Class III movement in accordance with AS 4654.1.

NOTE: Movement may occur from the following:

(a) Deflection before, during and after installation.

(b) Shrinkage and creep of materials after installation.

(c) Movement due to temperature variation.

(d) Movement due to moisture variation.

(e) Movement at joints.

(f) A combination of any of the above.

2.4 MEMBRANES

2.4.1 General

Materials used for design and installation to this Standard shall comply with AS 4654.1.

2.4.2 Service conditions

The design and installation of exposed and protected membrane systems, as determined in accordance with AS 4654.1, shall resist the following service conditions or any combination thereof:

(a) Ultraviolet light (where exposed).

(b) Heat ageing.

(c) Membrane temperature within the range of its operating temperatures.

NOTES:

1 Membranes used in Australia may experience variations in temperature from −15°C to +85°C. The actual range depends on local environmental conditions. Low temperatures may result in significant loss of elongation and high temperatures may result in softening and significant increase in elongation of the membrane. Extended exposure at high temperatures may result in a hardening of the membrane resulting in loss of elasticity.

2 Where thermal insulation is in direct contact with the membrane, consideration should be given to its effect on the temperature range to which the membrane is subject.

(d) Bioresistance.

(e) Water immersion.

(f) Chemical resistance.

NOTE: Cooling tower and swimming pool chemicals can adversely affect waterproofing membranes and service conditions. Such circumstances may require specific design.

2.5 SUBSTRATE

2.5.1 General

The substrate material in contact with the waterproofing shall be suitable for and compatible with the waterproofing membrane system.

Particleboard sheeting shall not be used as a substrate for external waterproofing systems.

Tile and slate underlay shall not be used externally as a waterproofing system.

NOTE: For further information on suitability of materials used for substrates, refer to the following:

(a) Concrete, AS 3600.

(b) Timber, AS 1684 (all parts).

(c) Plywood, AS/NZS 2269.

(d) Cellulose-cement products, AS/NZS 2908.2 or ISO 8336.

The substrate shall be resistant to moisture damage caused by condensation forming on the underside.

2.5.2 Falls

Falls in finishes shall ensure water drains to the drainage outlet. Water shall not be retained on the finished surface with the exception of residual water remaining due to surface tension.

The fall shall be in the structural substrate, or formed by a screed over the structural substrate.

NOTE: Falls for surface drainage should be no flatter than 1 in 100.

2.5.3 Types of substrates

2.5.3.1 *Fully bonded or liquid-applied*

The preparation of the substrate for fully bonded or liquid-applied membranes shall result in the surface of the substrate being smooth, without protrusions, voids or formwork distortions, and clean, dry, and free from dust and contamination.

NOTE: To aid in adhesion on a concrete or screeded surface, the smoothness of substrate should be at least the equivalent to that of a wood float or light broom finish. Priming may be required for some types of membrane.

The preparation of the substrate shall result in a moisture content applicable to the type of membrane to be applied.

NOTES:

1 Moisture content of the substrate may be determined by a non-invasive moisture meter test. Moisture content to mortar toppings and concrete should be 8.0% or less, or suitable for the membrane applied.

2 High moisture content of the substrate may cause blistering in some membranes and failure of the membrane system to fully cure.

The substrate shall be resistant to moisture damage that is caused by condensation forming on the underside of the substrate.

2.5.3.2 *Partially bonded*

The substrate shall be smooth, without protrusions, voids or formwork distortions, and clean, dry, and free from dust and contamination.

NOTE: If the moisture content is greater than 8%, venting should be used to relieve vapour pressure under the membrane.

2.5.3.3 *Unbonded*

The substrate shall be smooth, without protrusions, voids or formwork distortions, and clean, dry, and free from dust and contamination.

2.6 LAYING MEMBRANE

2.6.1 Junctions, lap joints, seams and cold joints

Treatment of junctions, lap joints, seams and cold joints shall be according to the type of system, and comply with the following minimum dimensions:

(a) *Bituminous sheet membrane* Sheet membranes shall be laid with minimum side laps of 70 mm and minimum end laps of 150 mm, both fully bonded with end laps staggered.

(b) *Synthetic rubber* Factory-vulcanized joints shall be overlapped 40 mm minimum. Field joints that are made with adhesives shall be overlapped a minimum of 50 mm for side laps and a minimum of 100 mm for end laps, with end laps staggered.

(c) *Flexible polymer sheet* Factory-welded seams shall be overlapped a minimum of 40 mm. Field-welded joints shall have a minimum of 100 mm overlaps when used over insulation boards, and a minimum of 75 mm overlaps in other instances. Joining may be made with a minimum of 100 mm wide overlapping tape, with end laps staggered.

The longitudinal direction of placement of the membrane shall commence at the lowest point and be in the same direction as the fall of the supporting substrate as shown in Figure 2.1.

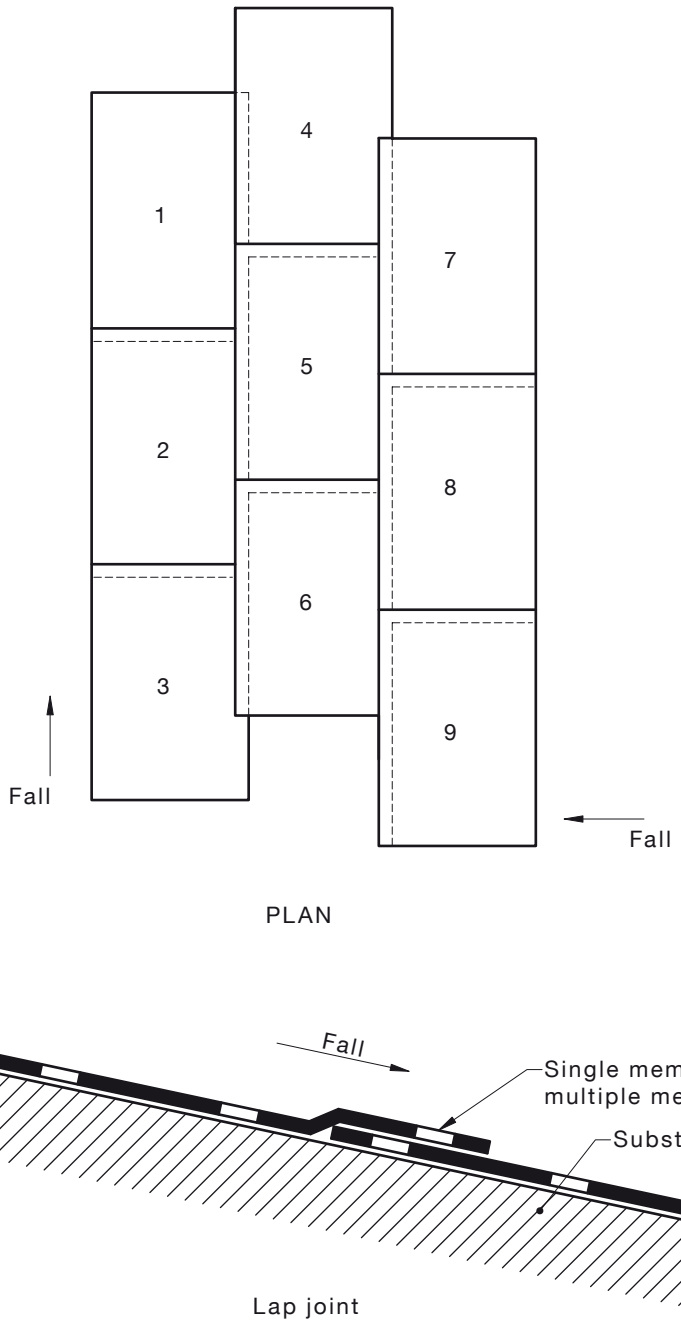


FIGURE 2.1 LAP JOINT FOR SHEET MEMBRANE—DETAILS

2.6.2 Curing

Components of membrane systems shall be cured.

NOTES:

1 Curing is mainly applicable to liquid-applied membranes and sealants.

2 Low temperatures, wet film thickness, relative humidity (RH), solids content and air movement can delay curing of some liquid-applied membranes, especially one-part membranes. A substrate with low porosity will delay curing of water-based membranes.

3 Further work should not be commenced until the membrane is cured.

4 Premature covering of the membrane may prevent it from curing and may lead to its degradation.

5 Intervals between applied membrane coatings should be taken into account due to varying curing times.

2.7 FILLETS

Fillets shall be used when a membrane changes from a horizontal to vertical or vertical to vertical plane.

NOTE: The cove should be dimensioned as a 40 mm × 40 mm fillet/cove for 'sheet' membranes and a 15 mm × 15 mm fillet/bond breaker for 'liquid' membranes.

2.8 TERMINATION OF MEMBRANES

2.8.1 Upward terminations

2.8.1.1 *Height*

Where the membrane termination is to prevent water entry, the finished height of the membrane above the finished surface level shall be sufficient to prevent water, including wind driven, flowing over the top of the membrane.

NOTE: For information on termination heights, see Appendix A.

2.8.1.2 *Anchoring*

Sheet membranes shall be secured along the top edge or bottom edge.

NOTE: The method of securing is dependent on the membrane type.

2.8.1.3 *Membrane termination finishing*

The sheet membrane shall be finished with over-flashing or cover-flashing.

NOTE: Typical membrane finishing with over-flashing is shown in Figure 2.2.

The termination of a pressure seal flashing shall comply with the following:

(a) Pressure seal flashing shall be attached using mechanical fixings at maximum 150 mm centres. The lap from the bottom edge of the mechanical fixing to the bottom edge of the pressure seal flashing shall be a minimum of 15 mm.

(b) Sealant shall be used to encapsulate the pressure seal flashing to the weatherproof wall.

(c) There shall be a minimum 10 mm gap between the bottom of the flashing and finished level.

NOTE: Typical details of pressure seal flashing are shown in Figure 2.3.

The termination of an over-flashing shall comply with the following:

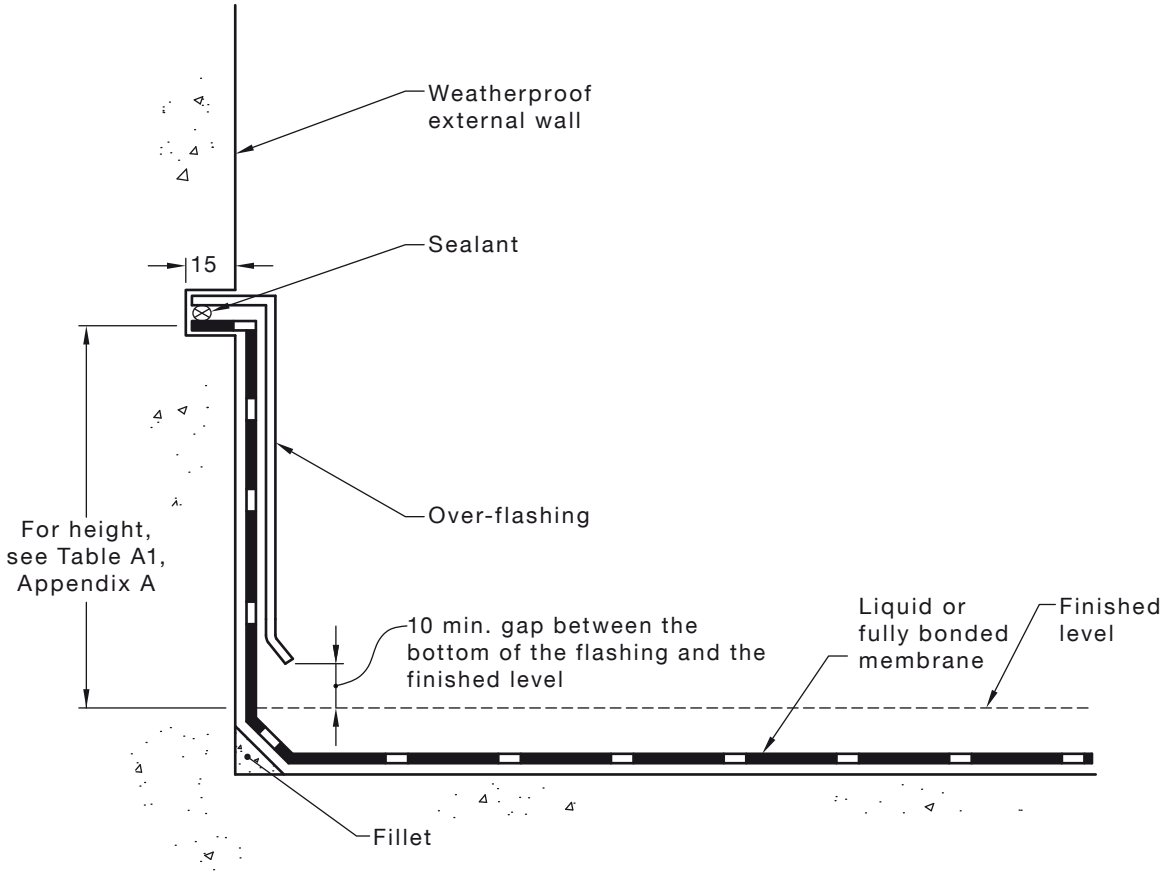
(i) The over-flashing shall be attached into the waterproof wall via a reglet of minimum 15 mm and shall be fixed in place and sealed with sealant.

(ii) The lap from the top edge of the sealed reglet to the bottom of the fully bonded membrane shall be a minimum of 75 mm.

(iii) There shall be a minimum 10 mm gap between the bottom of the flashing and the finished level.

For balconies with a fully bonded membrane, the membrane may be terminated at the drip groove.

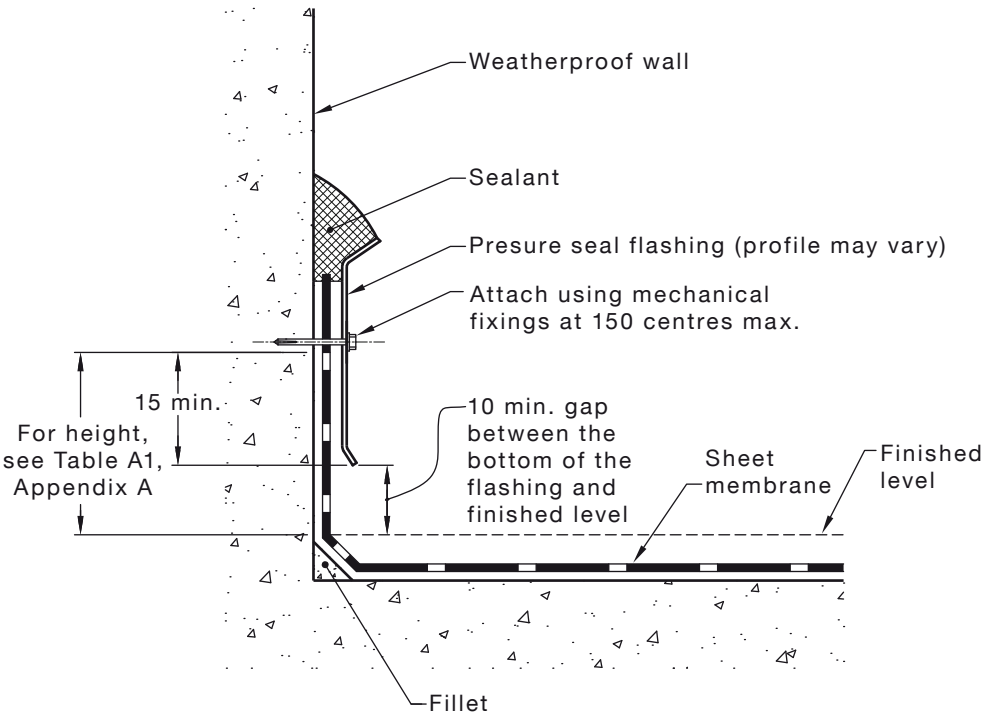
NOTE: For a typical treatment, see Figure 2.4(b).



NOTE: For falls, see Clause 2.5.2.

DIMENSIONS IN MILLIMETRES

FIGURE 2.2 TYPICAL VERTICAL UPWARD TERMINATION—DETAIL OF OVER-FLASHING FOR LIQUID OR FULLY BONDED SHEET MEMBRANES



NOTE: For falls, see Clause 2.5.2

DIMENSIONS IN MILLIMETRES

FIGURE 2.3 TYPICAL VERTICAL UPWARD TERMINATION—DETAIL OF PRESSURE SEAL FOR SHEET MEMBRANE

2.8.2 Vertical downward termination

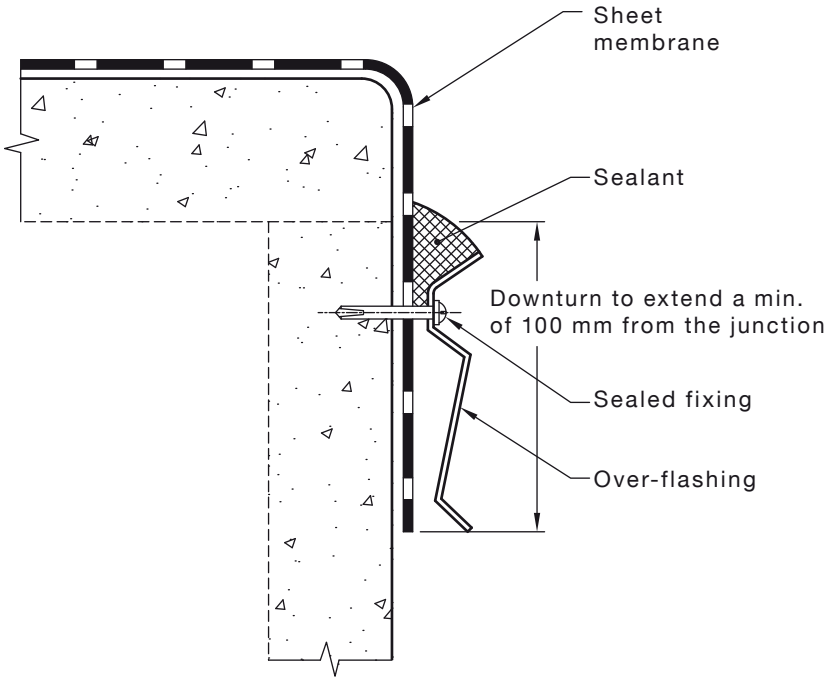
2.8.2.1 *Roofs and balconies*

The vertical downward termination for roofs or similar structures using sheet membrane shall extend a minimum of 100 mm from the junction.

NOTE: Typical vertical downward terminations are detailed in Figure 2.4. A typical 100 mm extension is shown in Figure 2.4(a).

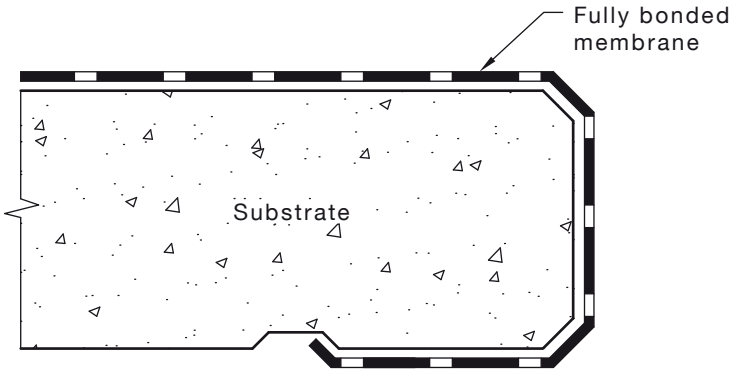
For balconies with a fully bonded membrane, the membrane may be terminated at the drip groove.

NOTE: For a typical treatment, see Figure 2.4(b).



NOTE: Gap between pressure seal flashing and membrane has been exaggerated for clarity.

(a) Roof edge detail for a sheet membrane system with pressure seal



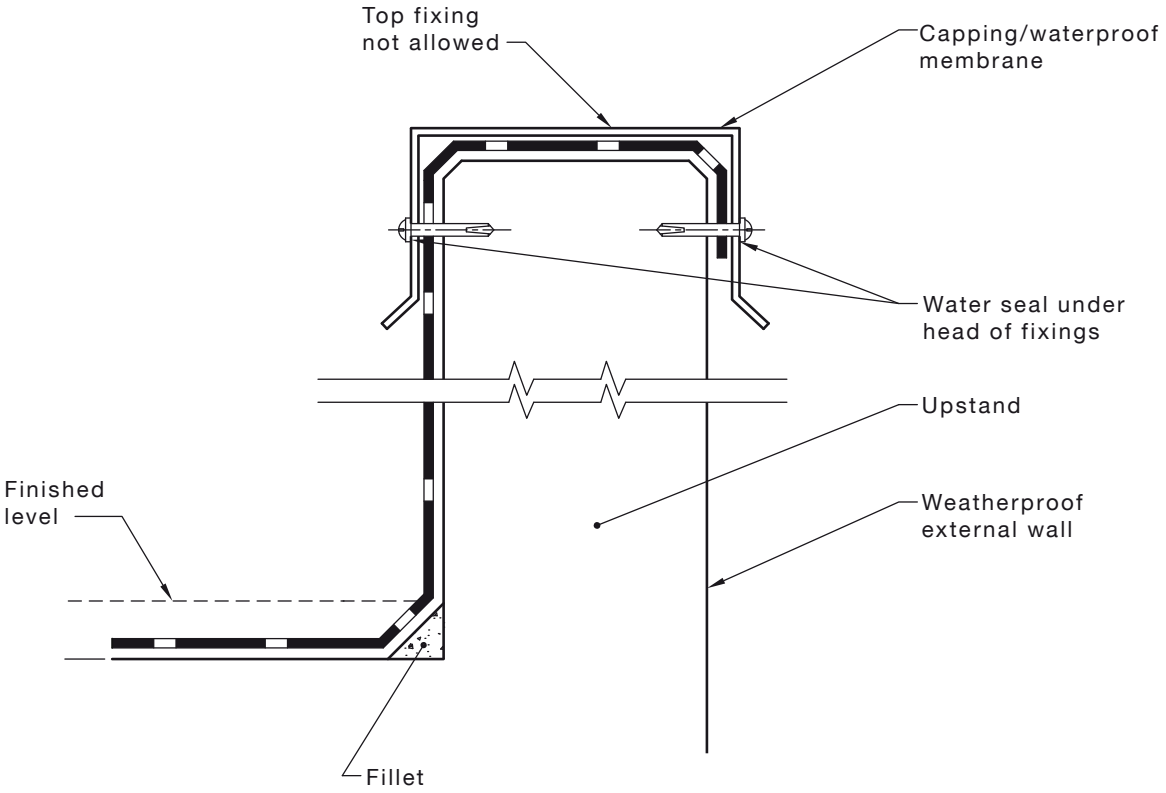
(b) Optional balcony edge detail for a fully bonded membrane

FIGURE 2.4 TYPICAL VERTICAL DOWNWARD TERMINATION

2.8.2.2 *Parapet*

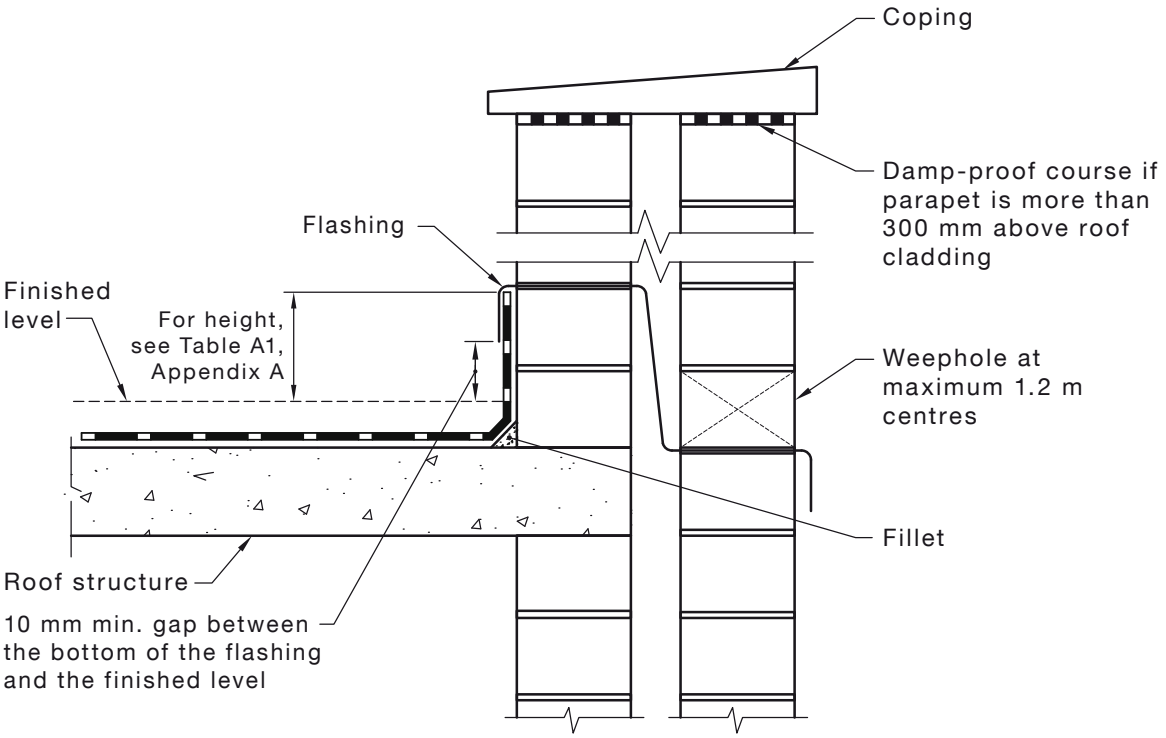
The top edges of the membrane shall be protected by the downturn of the cavity flashing.

NOTE: The typical methods of finishing over a parapet are shown in Figure 2.5. For a typical termination at a cavity parapet, see Figure 2.6.



NOTE: For falls, see Clause 2.5.2.

FIGURE 2.5 TYPICAL EDGE PROTECTION OF SHEET MEMBRANE OVER A PARAPET



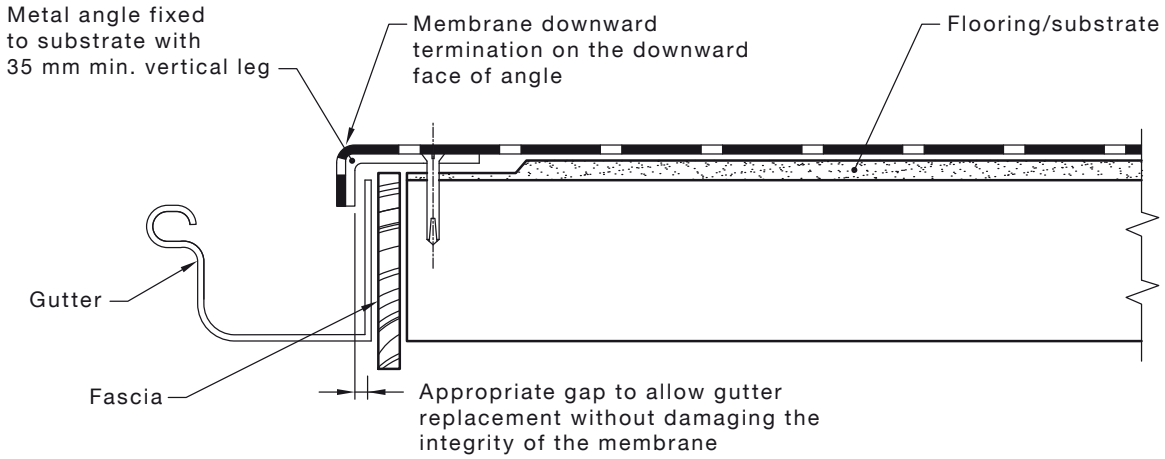
NOTE: For falls, see Clause 2.5.2.

FIGURE 2.6 TYPICAL MEMBRANE TERMINATION AT A CAVITY PARAPET

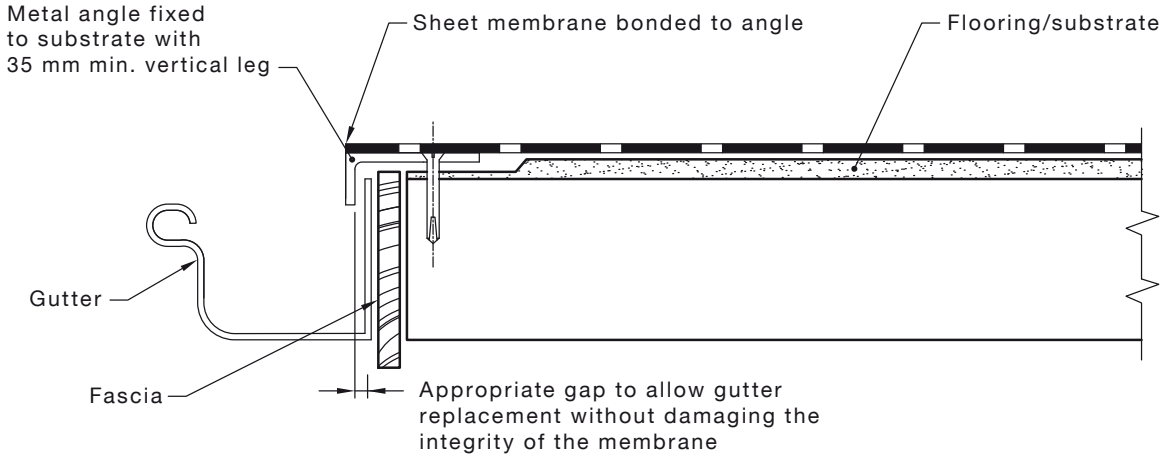
2.8.2.3 *Gutter termination*

A metal angle with a vertical leg of a minimum of 35 mm shall be fixed to the substrate.

NOTE: Typical terminations into guttering are shown in Figure 2.7.



(a) Option 1



(b) Option 2

NOTES:

1 Overflow facilities should divert water away from the building.

2 For falls, see Clause 2.5.2.

FIGURE 2.7 TYPICAL GUTTER TERMINATIONS—DETAIL

2.8.3 Doors and windows onto external waterproofed areas

For doors and windows onto external waterproofed areas, the following apply:

(a) Sub-sill flashing shall be included as part of the membrane system (see Note 1).

(b) Where the internal and external finished floor levels do not allow an upturn, the membranes shall be fixed under the sill and terminate in the stormwater system (see Note 2).

NOTES:

1 For typical detail of sub-sill flashing, see Figure 2.8.

2 For typical detail of membrane fixed under the sill and terminating in the stormwater system, see Figure 2.9.

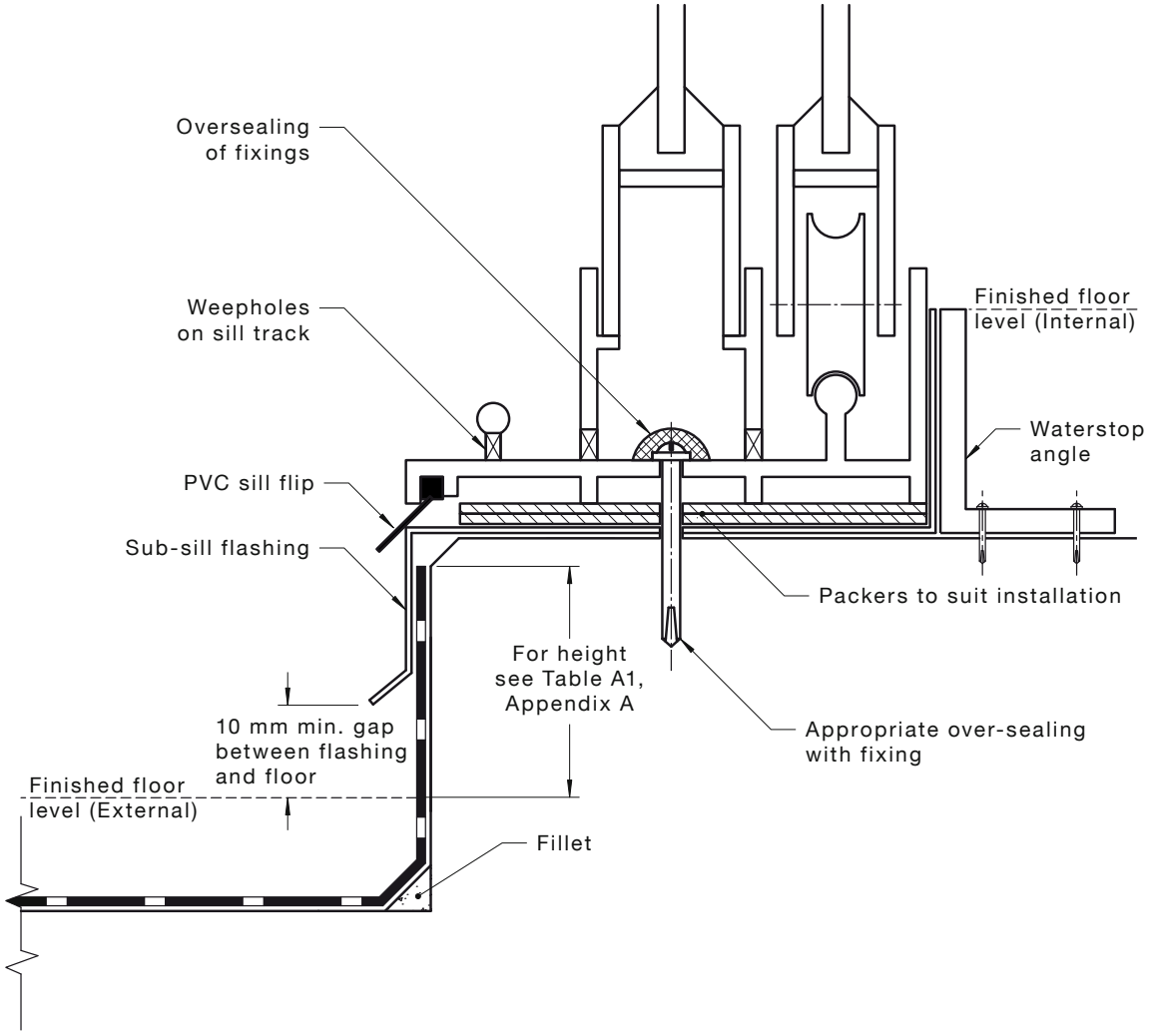
3 Ideally, the deck surface should fall away from the grate, and additionally the grate should be to the width of or greater than the opening.

4 Typical details of external terminations at external opening doors and at wall openings are shown in Figure 2.8 and Figure 2.9.

5 Openings should be provided with a set-down or hob to provide a vertical surface of sufficient dimension. See also Table A1, Appendix A.

6 Where circumstances do not permit the inclusion of a set-down or hob (e.g., for wheelchair access), a gutter should be formed into the substrate immediately in front of the opening.

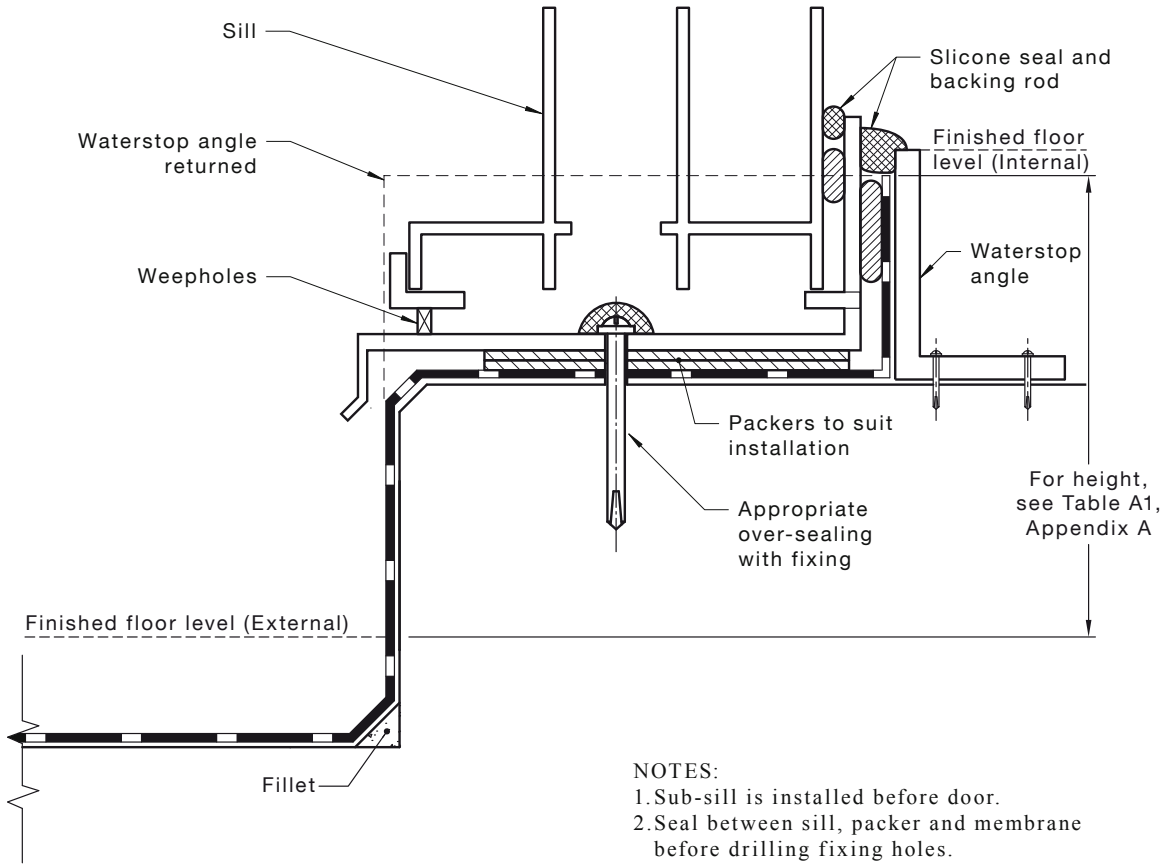
7 Requirements for fixings to seals and frames are given in AS 2047.



NOTE: For falls, see Clause 2.5.2.

(a) Option 1 Opening higher than sill upward termination

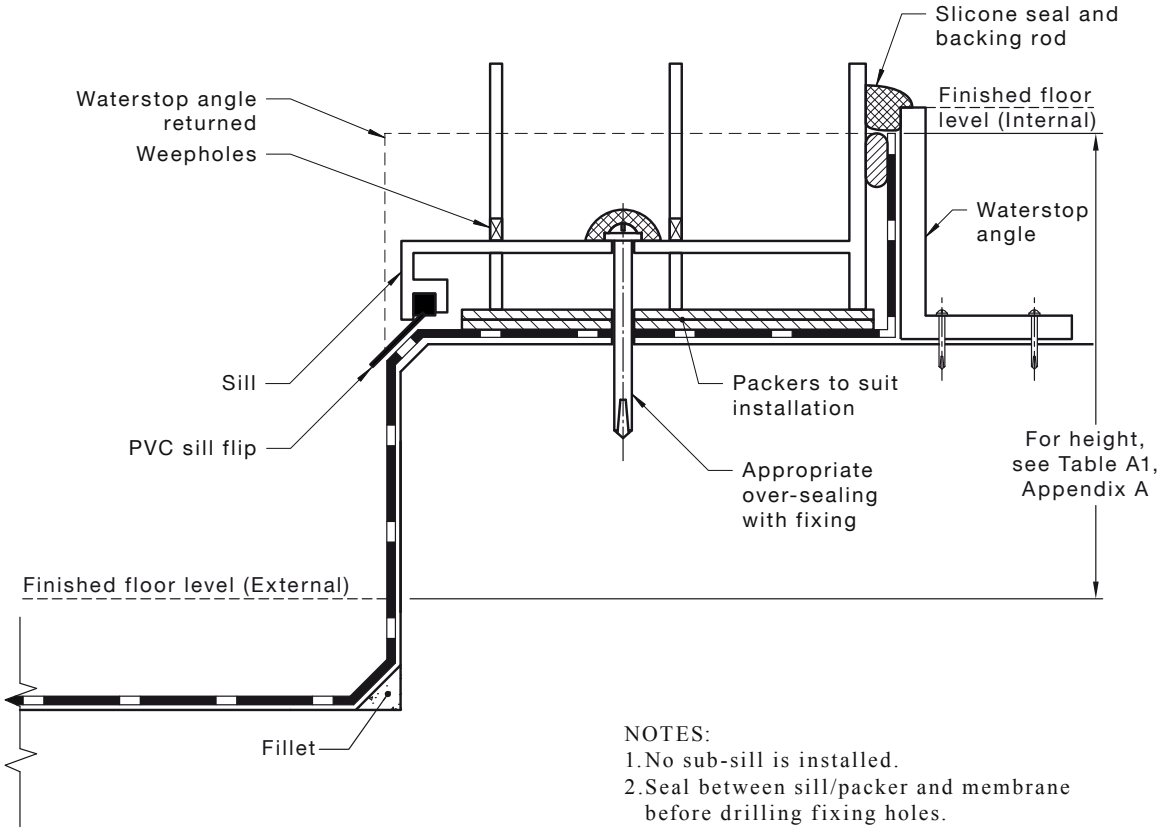
FIGURE 2.8 (in part) TYPICAL DETAILS OF MEMBRANE TERMINATION AT EXTERNAL OPENING DOORS



NOTE: For falls, see Clause 2.5.2.

(b) Option 2 Sill with sub-sill

FIGURE 2.8 (in part) TYPICAL DETAILS OF MEMBRANE TERMINATION AT EXTERNAL OPENING DOORS



NOTE: For falls, see Clause 2.5.2.

(c) Option 3 Sill—No sub-sill

FIGURE 2.8 (in part) TYPICAL DETAILS OF MEMBRANE TERMINATION AT EXTERNAL OPENING DOORS

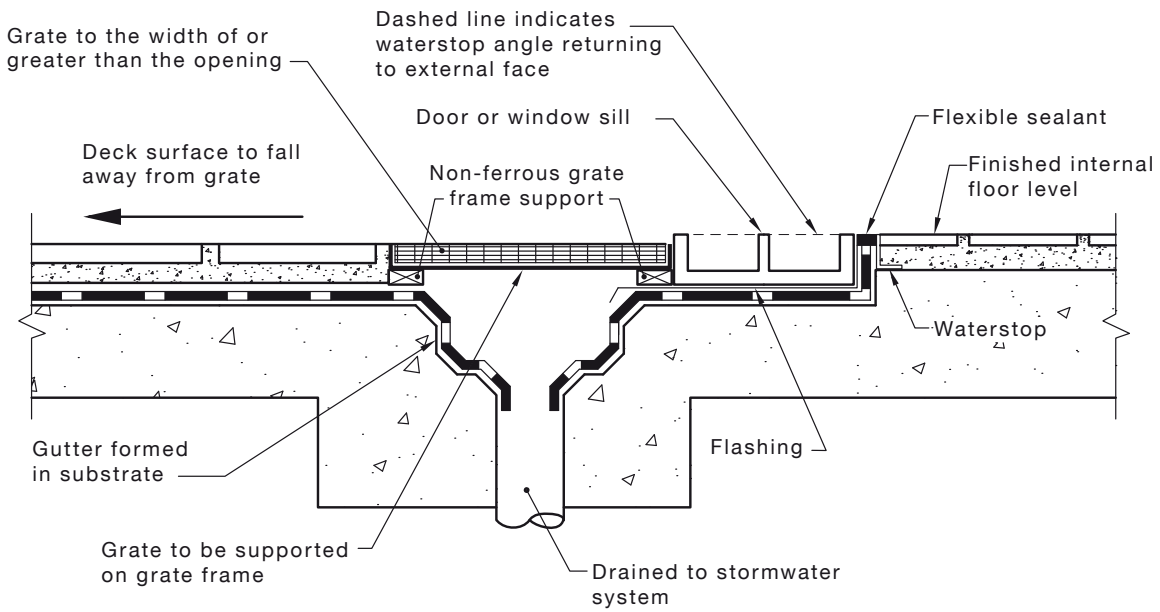


FIGURE 2.9 TYPICAL DETAILS OF MEMBRANE TERMINATION AT WALL OPENINGS WHERE THE INTERNAL AND EXTERNAL FINISHED FLOOR LEVELS DO NOT ALLOW FOR AN UPTURN

2.8.4 Penetrations

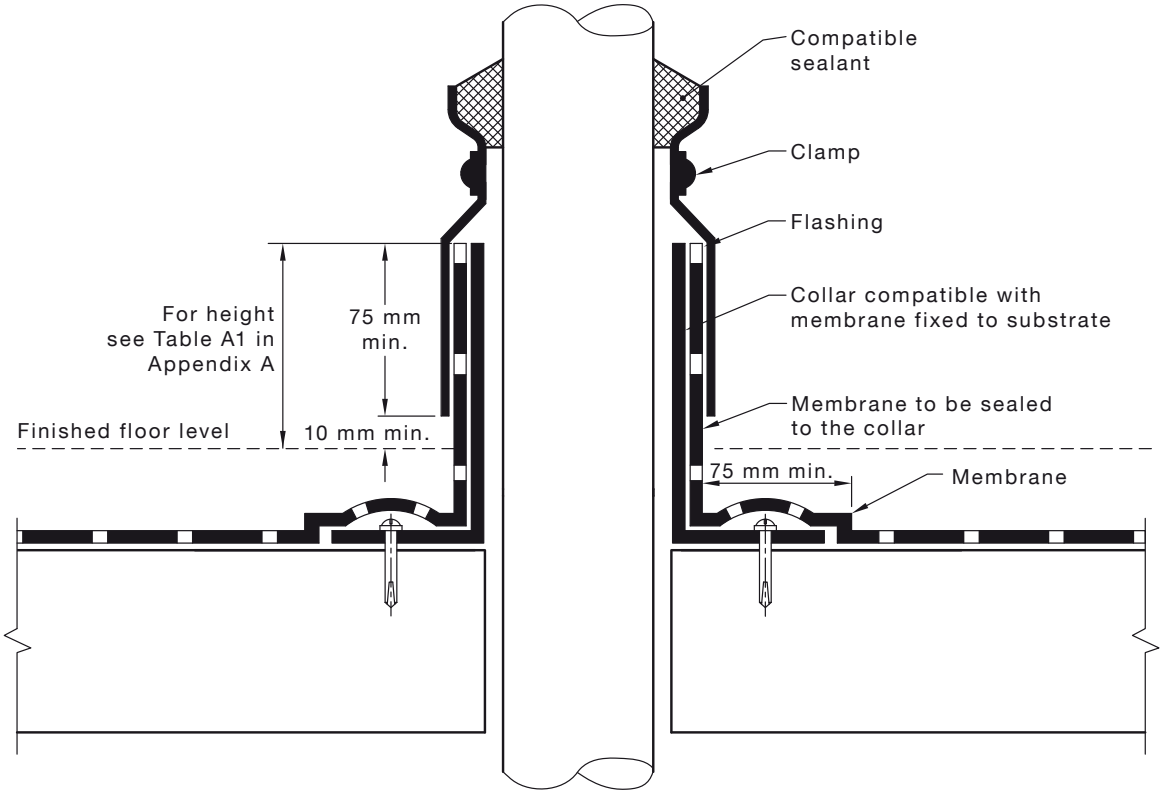
Any fixings that penetrate the membrane shall be sealed. The sealant shall be compatible with the surface material.

Where backing rods are used to support the sealant, they shall be a minimum of 12 mm.

NOTES:

1 Typical details of penetrations are shown in Figures 2.10 and 2.11.

2 Typical details of metal post supports are shown in Figure 2.12.



DIMENSIONS IN MILLIMETRES

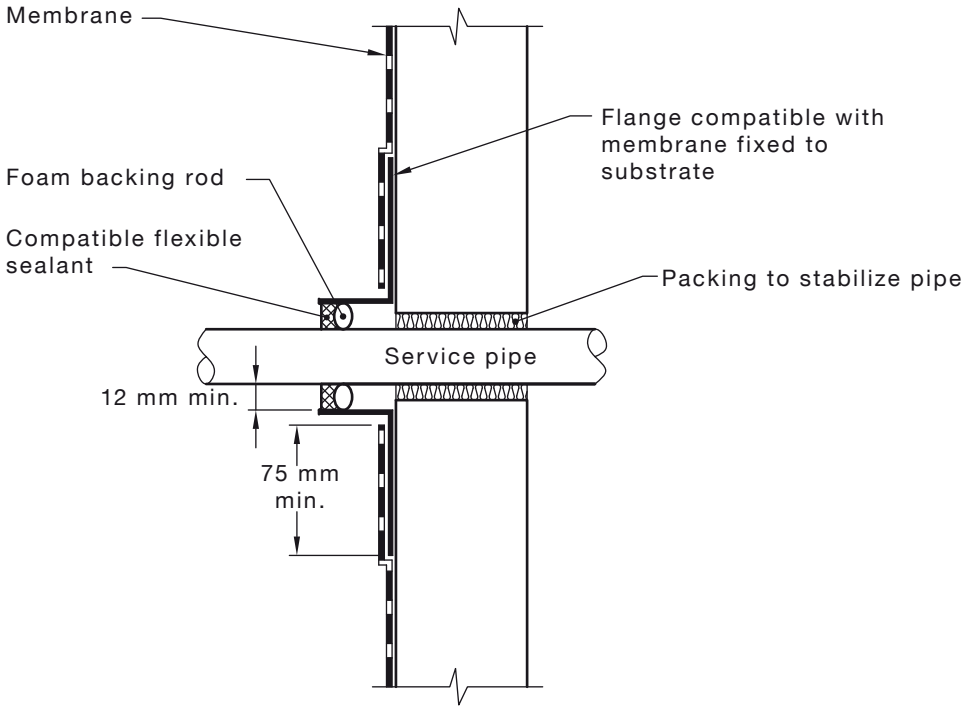
NOTES:

1 All pipes, ducts and vents should be located within a collar mechanically fixed to the substrate as an extension to the penetration. Alternatively, a collar may be cast into the substrate to form the penetration. A separate collar should be used for each penetration.

2 The membrane should be turned up around the penetration and over-flashed with a minimum overlap of 75 mm.

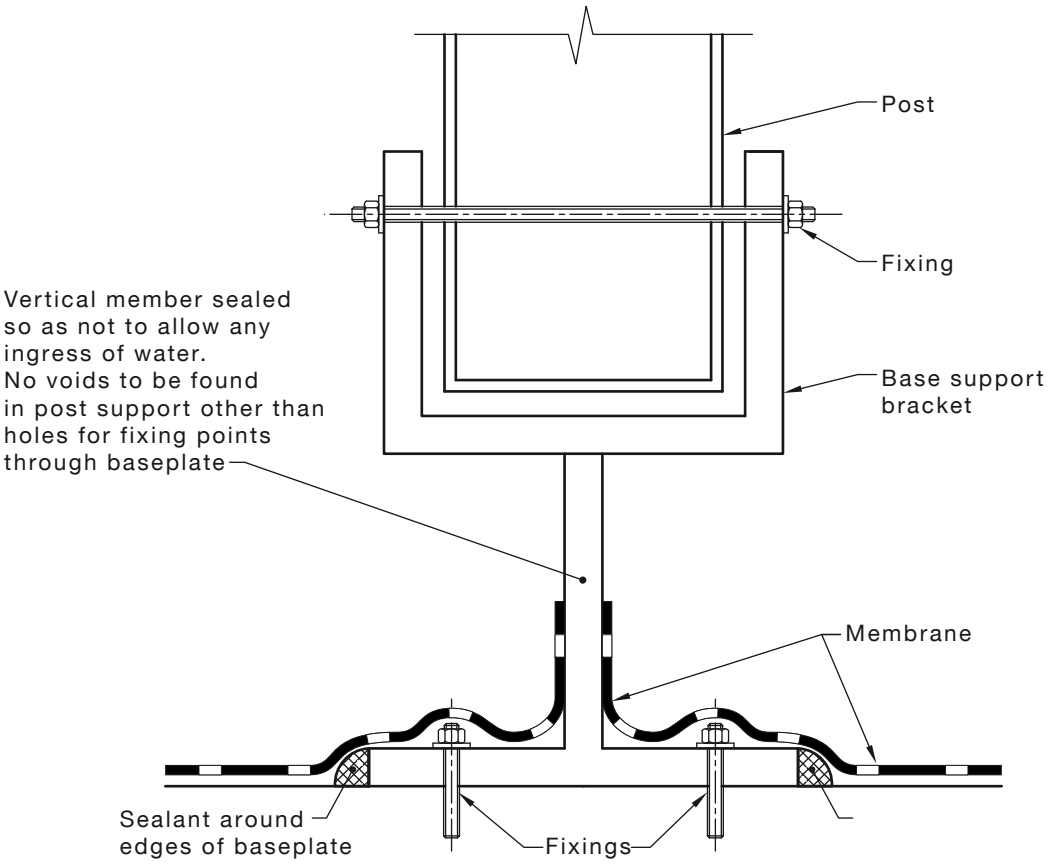
3 Sufficient clearance between pipe and sleeve/substrate to be provided.

FIGURE 2.10 TYPICAL DETAILS OF VERTICAL PENETRATION USING A COLLAR



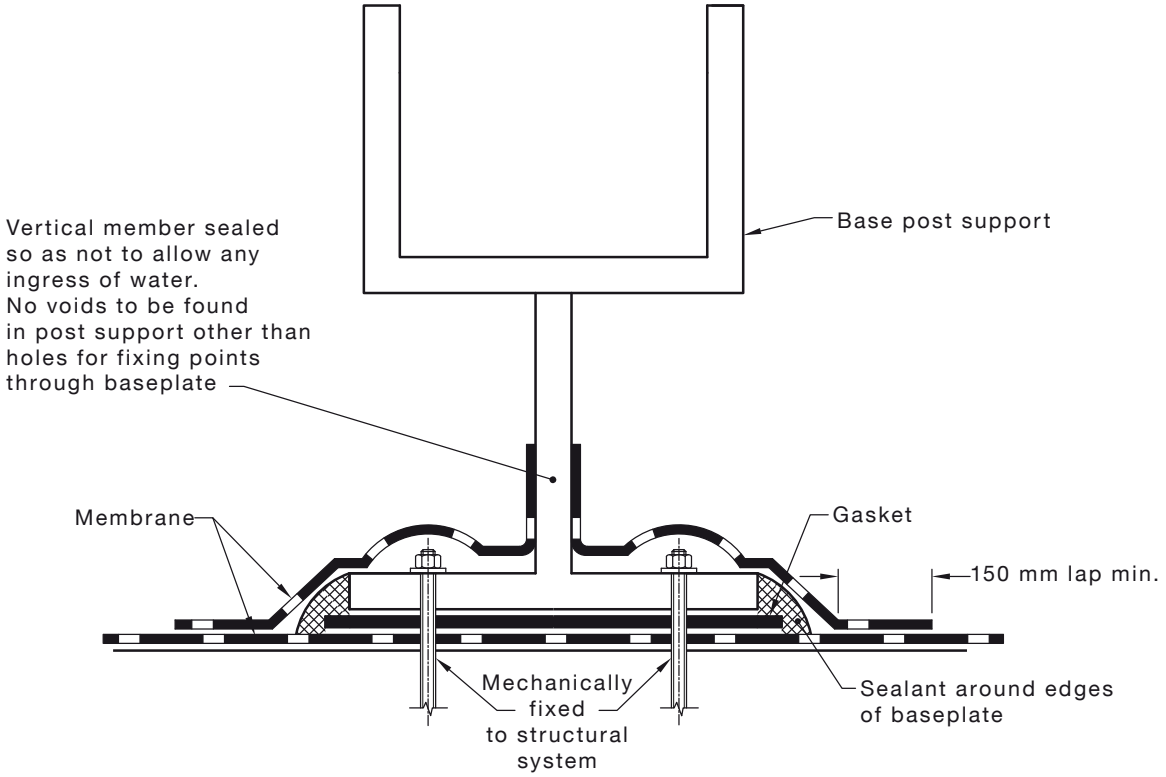
NOTE: Prime service pipe to allow for proper adhesion between sealant and pipe interface.

FIGURE 2.11 TYPICAL PENETRATION



(a) Prior to membrane installation

FIGURE 2.12 (in part) TYPICAL DETAILS OF METAL POST SUPPORT



(b) Post membrane installation

NOTES:

1 The membrane should be turned up around the post or support prior to membrane installation.

2 All post bases should be placed into position prior to placement of membrane. If posts are placed onto a completed membrane, any damaged membrane should be replaced or repaired to ensure its original integrity.

3 For posts penetrating through the deck, see Clause 2.8.4.

4 All penetrations into concrete should be treated with epoxy. All fixings into concrete should be of a chemically injected type in order to maintain the integrity of the waterproofing and substrate.

5 Consideration should be given to post designs that are fixed below the level of the deck without penetrating through the surface of the deck.

6 Waterproofing of the system will be compromised by the use of timber or metal posts that are not suitable for external use.

7 For base support to heavy structures or plant, extra consideration should be given to waterproofing and sealants to cater for the vibration movement around the base of the installations, such as—

(a) heavy plant and equipment and plinths;

(b) power poles;

(c) flagpoles;

(d) communication towers;

(e) roof access railings; and

(f) building maintenance units.

FIGURE 2.12 (in part) TYPICAL DETAILS OF METAL POST SUPPORT

2.8.5 Skylights

Where a skylight is to be installed, the membrane shall be upturned at the skylight to prevent water entry.

NOTE: The membrane should be installed with an upturn to the height given in Table A1, Appendix A, above the finished surface of the roof.

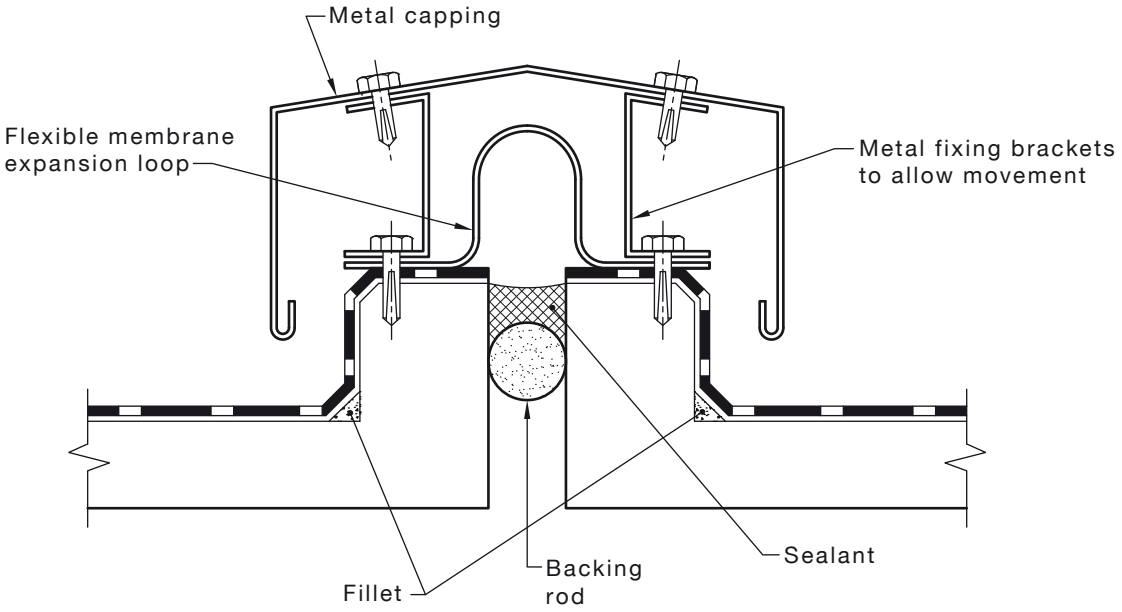
2.9 MOVEMENT AND CONTROL JOINTS

Where a building or structure has construction joints, movement joints or control joints, the membrane shall be either discontinuous or continuous over the joint, to allow for the anticipated movement. Where continuous, the membrane shall be unbonded for the first 100 mm.

NOTES:

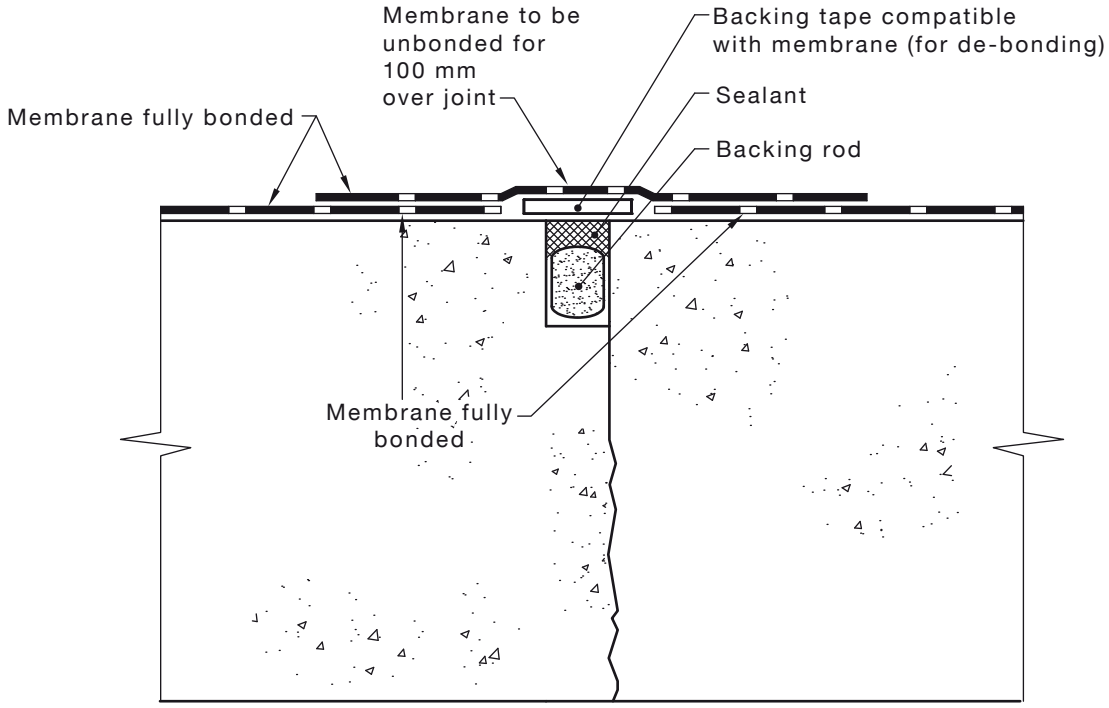
1 Typical detail of a discontinuous membrane over the joint is shown in Figure 2.13.

2 Typical detail of a continuous membrane over the joint is shown in Figure 2.14.



NOTE: For falls, see Clause 2.5.2.

FIGURE 2.13 TYPICAL DISCONTINUOUS ONE-WAY MOVEMENT JOINT



NOTE: For falls, see Clause 2.5.2.

FIGURE 2.14 TYPICAL CONTINUOUS MOVEMENT JOINT

2.10 DRAINS

The membrane shall be connected to the stormwater drainage system through a turn down of the membrane into the inlet of the system as shown in Figure 2.15.

An alternative connection may have a flange to which the membrane is clamped or attached (see Note 1).

To minimize blockage from debris, the drain shall have a sump, inlet pit, grate or cage.

NOTES:

1 The flange may be part of the inlet to the stormwater system or a separate item fitted on site.

2 Where the finished surface is above the level of the membrane, a variable level inlet or grate is used to provide surface drainage.

3 The variable level inlet should allow sub-surface drainage at the membrane level.

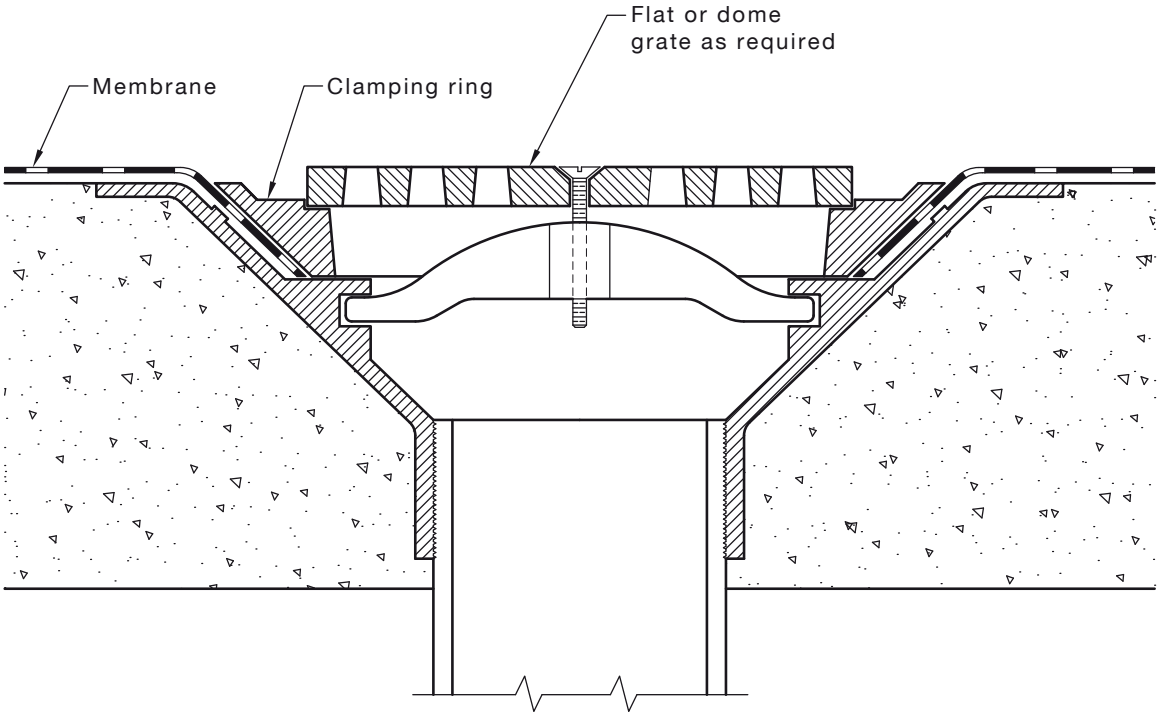


FIGURE 2.15 DRAINAGE DETAIL FOR AN EXPOSED MEMBRANE

2.11 OVERFLOWS

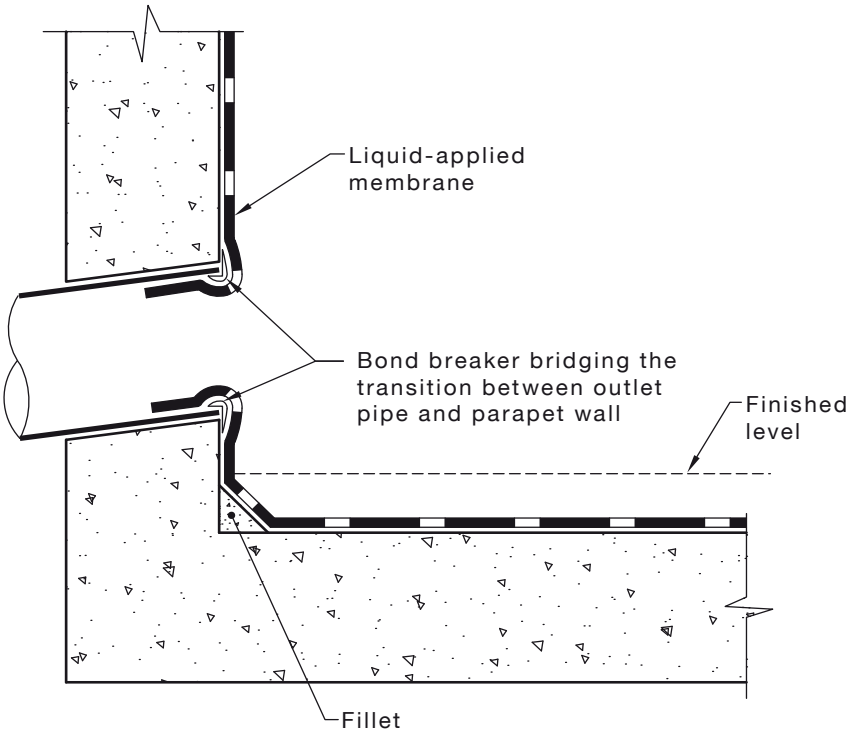
The membrane shall be turned into the overflow, to prevent moisture from tracking behind the membrane.

The finished floor level shall not reduce the design flow of an outlet.

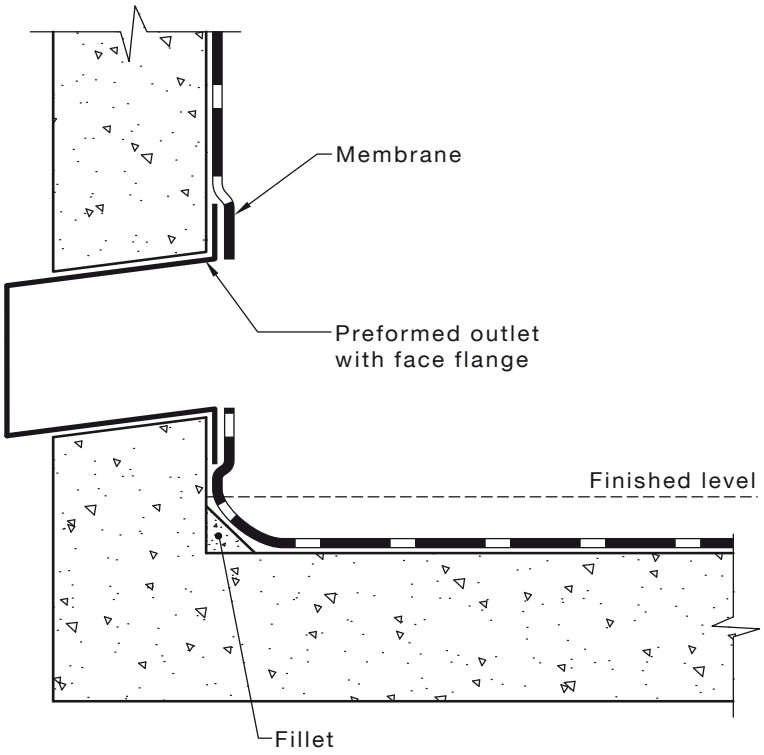
NOTES:

1 Typical examples of membranes turned into the overflow are shown in Figure 2.16.

2 Overflow facilities should direct water away from the building.



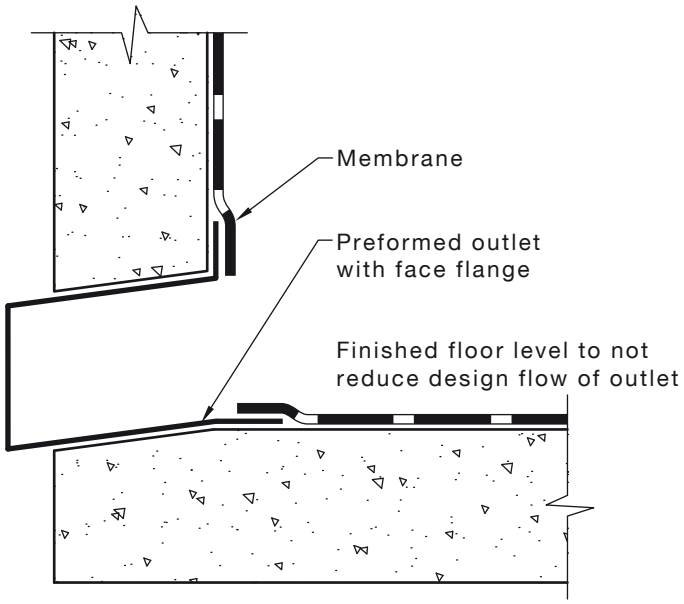
(a) Overflow through parapet



(b) Preformed overflow through parapet

NOTE: The overflow pipe should be located in a readily visible location to alert of a potential blockage.

FIGURE 2.16 (in part) TYPICAL DETAILS OF OVERFLOW



(c) Preformed outlet to parapet overflow

FIGURE 2.16 (in part) TYPICAL DETAILS OF OVERFLOW PIPE

2.12 CHANGES IN DIRECTION OR UPSTANDS

Any changes in the membrane's direction from horizontal to vertical shall meet the requirements of Clause 2.3.

The membrane system shall be designed to accommodate differential horizontal movement (shear) between the vertical and horizontal substrate.

Bond breakers shall be provided where movement between substrates is expected. They shall be of sufficient dimension to allow the membrane to accommodate the movement.

Upstands (e.g., piers or posts) shall be treated as posts and post supports, and shall be detailed in accordance with Clause 2.8.4.

Hobs around plant rooms or similar structures shall be treated as upward terminations and shall be detailed in accordance with Clause 2.8.1.

NOTE: Plinths used for exposed plant should be placed over the roofing membrane. Protection of the membrane against vibration should be provided.

2.13 PLANTER BOXES

The membrane shall be sealed to the drainage outlet. It shall extend vertically to a height of 100 mm above the soil or fill level.

Falls in the base of the planter shall be in accordance with Clause 2.5.2.

NOTES:

1 The planter box should be provided with a suitable overflow.

2 Protection boards should be provided to minimize root damage to the waterproofing membrane. The suitability of the plants to be installed should be considered, as certain rooting systems are aggressive and may penetrate the membrane.

3 Mulch should be considered when determining the soil fill level.

4 Externally exposed walls of planter boxes should be waterproofed to prevent failure of the internal planter box membrane.

5 A typical example of waterproofing inside a planter box is shown in Figure 2.17.

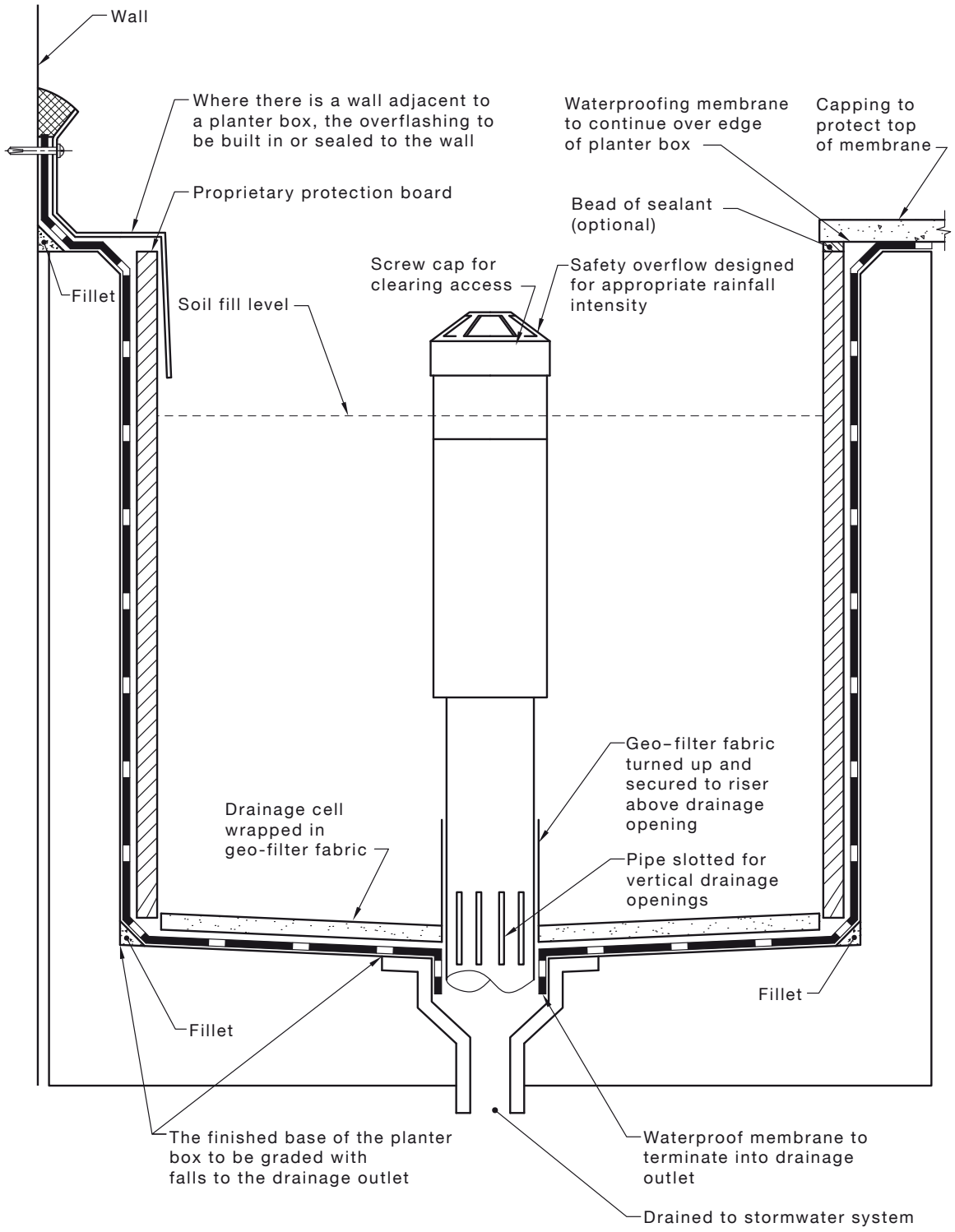


FIGURE 2.17 TYPICAL PLANTER BOX CONSTRUCTION

2.14 PROTECTION DURING CONSTRUCTION

Except for exposed and trafficable membrane systems, the membrane shall be protected from damage after installation until covered or finishes are installed

NOTES:

1 Protection may include physical barriers, restricted access, elevated walkways and protection boards.

2 Some membranes may be sensitive to moisture during the early stages of curing. Such membranes need to be installed where they will not be adversely affected by inclement weather or have to be protected during curing.

2.15 OVERLAYING SURFACE FINISHES

2.15.1 General

Where a membrane is to be overlayed with another system (e.g. tiles, pavers, ballast, insulation, soil and the like), the overlaying system shall be compatible with, and not cause damage to, the membrane.

NOTES:

1 In some instances a slip sheet or protection board may be required between the membrane and the overlaying surface.

2 During the installation of the overlaying system, care should be exercised to avoid damage to the membrane.

2.15.2 Bonded or partially bonded systems

Where the topping or bedding mortar is to be bonded to the membrane, sufficient movement joints shall be provided in the topping or bedding mortar to accommodate the movement over the membrane.

NOTE: Ideally, movement joints of a minimum width of 10 mm are installed at 4.5 m intervals in any direction in a bonded screed system.

Where the topping or bedding mortar is structurally sufficient not to require bonding to the substrate, a double slip sheet shall be laid over the membrane to separate it from the screed.

NOTES:

1 A structural unbonded screed should be of a minimum thickness of 50 mm with lightweight mesh reinforcing.

2 In some instances, additional movement joints may be required in the bonded or unbonded finish.

2.15.3 Transfer of movement joints in finishes

For bonded finishes, the movement joints shall be located above the movement and control joints as specified in Clause 2.9.

2.16 INSPECTION AND ACCEPTANCE TEST

On completion of the installation of a membrane system, inspection and/or acceptance testing shall be conducted.

NOTE: A visual inspection should be conducted and/or one of the following test procedures undertaken:

(a) For a liquid membrane system, the dry film thickness (DFT) to be tested by non-destructive means.

(b) A controlled water test to be conducted for a minimum duration of 24 h.

APPENDIX A

VERTICAL UPWARD TERMINATION HEIGHTS

(Informative)

This Appendix applies to the determination of vertical upward termination of height as given in Table A1.

The vertical heights may be determined by either of the following methods:

(a) Vertical upward termination to be at a height above finished level not less than specified in Table A1.

(b) Where stormwater retention is designed into the waterproofed area, the height of the upturn to be above the overflow level.

TABLE A1

VERTICAL UPWARD TERMINATION HEIGHTS

Wind class Regions A and B (non-cyclonic) AS 4055	Wind class Regions C and D (cyclonic) AS 4055	Ultimate limit state wind speed ($V_{h,u}$) AS/NZS 1170.2	Termination height mm
N1	—	34	40
N2	—	40	50
N3	C1	50	70
N4	C2	61	100
N5	C3	74	150
N6	C4	86	180

APPENDIX B

MAINTENANCE

(Informative)

Where visible, the waterproofing system should be inspected on a regular basis for evidence of deterioration.

An inspection and maintenance schedule should be determined, which should include, as a minimum, the following critical areas:

(a) Deterioration of membrane, adhesion, flashings, cappings, fixings, sealant, lap joints and coatings.

(b) Traffic damage.

(c) Structural interference.

(d) Blockage of drainage systems.

(e) Root damage.

(f) Birds, pests and wildlife attack.

Any necessary repairs or maintenance should be carried out promptly.

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1684	Residential timber-framed construction (all parts)
3600	Concrete structures
4055	Wind loads for housing
AS/NZS	
1170	Structural design actions
1170.2	Part 2: Wind action
2269	Plywood—Structural (all parts)
2908	Cellulose-cement products
2908.2	Part 2: Flat sheet
4020	Testing of products for use in contact with drinking water
4586	Slip resistance classification of new pedestrian surface materials
4858	Wet area membranes
ISO	
8336	Fibre cement flat sheet—Product specification and test methods

NOTES

NOTES

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