

0411P MAPEI IN WATERPROOFING – EXTERNAL AND TANKING

Branded worksection

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Worksection abstract

This worksection *Template* is applicable to Mapei waterproofing membrane systems for new construction and remedial waterproofing including roofing, podiums, decks, balconies, concrete slabs over below ground spaces, retaining walls, tunnels, landscape and planter boxes and tanking. It relies on AS 4654.1 and AS 4654.2. It includes concrete mixtures and penetrant sealers but excludes decorative coatings.

Guidance text

All text within these boxes is provided as guidance for developing this worksection and should not form part of the final specification. This *Guidance* text may be hidden or deleted from the document using the NATSPEC Toolbar or the hidden text *Hide* and *Delete* functions of your word processing system. For additional information visit FAQs at www.natspec.com.au.

Optional style text

Text in this font (blue with a grey background) covers items specified less frequently. It is provided for incorporation into *Normal* style text where it is applicable to a project.

Related material located elsewhere in NATSPEC

If a listed worksection is not part of your subscription package and you wish to purchase it, contact NATSPEC.

Related material may be found in other worksections. See for example:

- *0181p MAPEI in adhesives, sealants and fasteners.*
- *0193 Building access safety systems.*
- *0314 Concrete in situ.*
- *0315 Concrete finishes.*
- *0471 Thermal insulation and pliable membranes* for membrane protection boards and insulation boards.
- *0612 Cementitious toppings.*
- *0613 Terrazzo in situ.*
- *0621 Waterproofing – wet areas.*
- *0621p MAPEI in waterproofing - wet areas.*
- *0802 Hydraulic design and install.*

Cross references

Worksections that reference this worksection are:

- None.

Material not provided by Mapei

This branded worksection includes generic material which may not be provided by the Product Partner.

Documenting this and related work

You may document this and related work as follows:

- Location, extent and type of membrane including details of junctions with flashings and damp-proof courses on the drawings.
- Plan structural control and expansion joints to avoid critical areas such as low points in slabs, planter boxes and above habitable rooms, and show on the drawings.

The *Normal* style text of this worksection *Template* may refer to items as being documented elsewhere in the contract documentation. Make sure they are documented.

Search acumen.architecture.com.au, the Australian Institute of Architects' practice advisory subscription service, for notes on the following:

- Guarantees and warranties.
- Waterproofing.

Specifying ESD

The following may be specified by including additional text:

- Low VOC emitting liquid membrane systems.
- Recycling of construction scrap materials.

Refer to the NATSPEC TECHreport TR 01 on specifying ESD.

1 GENERAL

Mapei is a world leader in the manufacture of innovative products for the construction industry. Products include adhesives, grouts, waterproofing membranes, levelling compounds, repair mortars and quality related building products. Numerous projects executed all around the world are testimony to the outstanding quality of Mapei products that are preferred by architects, designers and building contractors. Mapei products are manufactured in Brisbane and distributed through an extensive network of distributors.

1.1 RESPONSIBILITIES

General

Requirement: Provide Mapei waterproofing membrane systems for roofing, podiums, decks, balconies, swimming pools, concrete slabs over below ground spaces, brick and concrete walls with negative lift, lift shafts, landscape and planter boxes, and tanking, as documented,

Documented is defined in 0171 General requirements as meaning contained in the contract documents.

Performance

Requirements: Conform to the following:

- Graded to falls to dispose of stormwater without ponding above the depth of lapped seams.
- Able to accommodate anticipated building movements.
- Able to accommodate its own shrinkage over the warranty life of the roofing system.
- Able to resist water under hydrostatic pressure.

Consider adding the required service-life of the membrane system (material and installation), 10 to 15 years appears normal.

When making selections, consider products with the following characteristics:

- Able to accommodate anticipated environmental conditions including UV light.
- Able to remain serviceable after material shrinkage and loss of elastic properties.
- Resistant to traffic and falling objects including hail.
- Chemically compatible with the surrounding building materials.
- Capable of permanent immersion (e.g. tanking, tiled areas).

1.2 COMPANY CONTACTS

Mapei technical contacts

Website: www.mapei.com/AU-EN/contacts.asp

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- 0171 General requirements.

0171 General requirements contains umbrella requirements for all building and services worksections.

List the worksections cross referenced by this worksection. 0171 General requirements references the 018 Common requirements subgroup of worksections. It is not necessary to repeat them here. However, you may also wish to direct the contractor to other worksections where there may be work that is closely associated with this work.

NATSPEC uses generic worksection titles, whether or not there are branded equivalents. If you use a branded worksection, change the cross reference here.

1.4 STANDARDS

Membrane materials

Standard: To AS 4654.1.

Membrane design and installation

Standard: To AS 4654.2.

Stormwater drainage

Standard: To AS/NZS 3500.3.

AS 4654.1 and AS 4654.2 are applicable for external and above ground use only. Materials selected for tanking and waterproofing of below ground structures should be designed and selected with the assistance of a specialist waterproofing consultant and with the manufacturer or supplier.

1.5 MANUFACTURERS DOCUMENTS

Mapei Technical manuals

Data sheets: www.mapei.com/AU-EN/products.asp

Systems: www.mapei.com/AU-EN/systems.asp

1.6 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions given in AS 4654.1 and AS 4654.2 and the following apply:

- Bitumen: A viscous material from the distillation of crude oil comprising complex hydrocarbons, which is soluble in carbon disulphide, softens when it is heated, is waterproof and has good powers of adhesion. It is produced as a refined by-product of oil.
 - . APP Bitumen: Bitumen modified with Atactic (meaning non-crystalline or amorphous) polypropylene wax to form a plastomeric sheet. The membrane is reinforced with fibreglass or non-woven polyester (NWP).
 - . SBS bitumen: Bitumen modified with Styrene Butadiene Styrene, a thermoplastic rubber that undergoes a phase inversion at elevated temperature and converts to an elastomeric material. The membrane is reinforced with fibreglass or non-woven polyester (NWP).
- Bond breaker: A system preventing a membrane bonding to the substrate, bedding or lining.
- Double detail joint: A joint formed by turning up and bonding the horizontal membrane to a vertical substrate and adding an overflashing of membrane material bonded to the vertical substrate and folded over and bonded to the horizontal membrane. In certain situations the double detail can be achieved by bonding an angle profile of membrane material to the junction prior to laying the membrane.
- Liquid applied: A water-based formulation which cures to form elastomeric membranes.

Urethane modified acrylics have better resistance to ponding. Products include acrylics, modified polyurethanes (water-based), polyuria and modified cementitious systems.

- Polyurethane: Water or solvent based formulations which moisture cure to form an elastic rubber membrane.

They can be made more cheaply with bitumen at the expense of long term properties.

- PVC membrane: Flexible plastic sheet membrane (vinyl).
- Slip sheet: A sheet used to isolate the membrane system from the supporting substrate or from the topping or mortar bedding. The most common material is polyethylene.
- Substrate: The surface to which a material or product is applied.

Edit the **Definitions** subclause to suit the project or delete if not required. List alphabetically.

1.7 SUBMISSIONS

Products and materials

Manufacturer's documentation: Submit copies of the following data:

- Product technical data sheets.
- Safety data sheets (SDS).
- Preventative maintenance procedures.
- Instructions and procedures for the repair of the membrane.
- Type test certificates verifying compliance with AS 4654.1 Section 2, Tables 2.1 to 2.3.

Prototypes

General: Apply waterproofing to 10 m² of substrate to demonstrate surface preparation, crack and joint treatment, corner treatment, and execution quality. Install final surface finish to demonstrate aesthetic affects, physical properties, and quality of materials and execution as applicable.

Nominate an approval process and indicate if the prototype is to be retained, Indicate location, size, and other details of prototypes on drawings. Delete if not required.

Records

Placing records: Photographically record the application of membranes and label with the following information:

- Date.
- Portion of work.
- Substrate preparation.
- Weather during application and curing.
- Protection provided from traffic and weather.

Liquid membrane applications:

- Record wet film thickness once every 10 m² and compare to the manufacturers requirements.
- On completion of every 100 m² of each coat compare the amount of membrane used with the manufacturers application rate and record the result.

For large or complex projects consider adding the following requirements:

Daily reports: Provide daily reports of membrane placed including:

- The location and element where each membrane was placed.
- The method of placing and climatic conditions.
- Personnel: Employ a suitably qualified person to monitor the placing and protection of the membrane and prepare the daily report.
- Flood tests: Photographically record flooded area and adjacent areas noted in **Flood test**. Label photographs with date and location.

Samples

Requirement: Submit 300 x 300 mm samples of each type of membrane including the finish of the visible surface.

Shop drawings

Requirement: Submit shop drawings showing the following:

- Junctions with vertical surfaces.
- Drainage details.
- Control joints.
- Flashings.
- Penetrations.
- Corners.
- Terminations and connections.
- Membrane layers.
- Insulation and protection.

An alternative is to prepare these details in consultation with the membrane supplier. Delete as appropriate.

Subcontractors and suppliers

General: Submit names and contact details of proposed suppliers and installers recommended by Mapei.

Evidence of experience: [complete/delete]

Delete if supplier/installer details are not required.

Warranties

Requirement: Submit warranties to **COMPLETION, Warranties.**

1.8 INSPECTION**Notice**

Inspection: Give notice so that inspection may be made of following:

- Substrate preparation completed.
- Secondary layers preparation completed.
- Before membranes are covered up or concealed.
- Underflashings complete before installation of overflashings.

- After flood testing.

Amend to suit the project adding critical stage or mandatory inspections required by legislation or regulation.

Hold points, if required, should be inserted here.

2 PRODUCTS

2.1 GENERAL

Product substitution

Other products: Conform to **PRODUCTS, GENERAL, Substitutions** in *0171 General requirements*.

The *0171 General requirements* clause sets out the submissions required if the contractor proposes alternative products. Refer also to NATSPEC TECHnote GEN 006 for more information on proprietary specification.

Storage and handling

Store and handle to the manufacturer's recommendations and as follows:

- Protect materials from damage.

Marking

Identification: Marked to show the following:

- Manufacturer's identification.
- Product brand name.
- Product type.
- Quantity.
- Product reference code and batch number.
- Date of manufacture.
- Material composition and characteristics such as volatility, flash point, light fastness, colour and pattern.

Edit the list to suit the project or delete if not required.

2.2 MAPEI CEMENTITIOUS PRODUCTS

Mapei repair mortar

Application: Concrete repair for exterior vertical and horizontal deteriorated concrete surfaces e.g. edges of pillars, beams, and balconies damaged by the oxidation of reinforcing rods; surface cracks (in all types of buildings) in concrete and cement renders; surface defects in concrete pour; damaged edges of concrete pipes and pointing between bricks on structures to be waterproofed with Idrosilex Pronto.

Mapegrout T40: Medium strength (40 MPa) shrinkage-compensated, fibre-reinforced thixotropic mortar for repairing concrete.

- VOC content: 0.01 g/l.

Mapegrout T60: Sulphate resistant, fibre-reinforced shrinkage-compensated, thixotropic mortar for the repair of concrete.

- VOC content: 0.01 g/l.

Mapegrout Fast-set: Fast-setting and drying, shrinkage-compensated, fibre-reinforced mortar for concrete repair.

- VOC content: 0.01 g/l.

Mapegrout Hi-flow SP: Shrinkage-compensated, fibre-reinforced mortar to repair structures where particular thicknesses and the state of deterioration require the use of a high flow mortar.

- VOC content: 0.01 g/l.

Planitop Smooth and Repair R4: Structural R4-class, rapid-setting, shrinkage-compensated, thixotropic, fibre-reinforced cementitious mortar for structural repairs and smoothing over internal and external horizontal and vertical concrete surfaces.

- VOC content: 0.01 g/l.

Planitop Fast 330: Quick-setting, fibre-reinforced cementitious levelling mortar for internal and external floors and walls, applied in layers from 3 to 30 mm to even out irregularities.

- VOC content: 0 g/l.

Planiprep SC: High performance, rapid-setting, fibre-reinforced skim-coating and patching compound in interiors.

- VOC content: 0.01 g/l.

Mapecem Quickpatch: High performance, high flow, fast-setting ramping and patching compound for use in interiors and exteriors.

- VOC content: 0.01 g/l.

Mapegrout SV: Fast-setting and hardening shrinkage-compensated, easy flow mortar for repairing concrete and for fixing inspection shafts, manholes and highway coating materials.

- VOC Content: 0.01 g/l.

Mapei cementitious screeds

Application: Formation of floating and bonded screeds on both existing and new slabs for the installation of ceramic tiles, stone material, wood or any other flooring where rapid drying and immediate relaying is required.

Mapecem Pronto: Pre-blended ready-to-use, quick-setting (24 hours) and drying, controlled shrinkage screed with a hydraulic binder base, admixtures and selected aggregates. Simply mix with water as per Technical Data Sheet.

- VOC content: 0.01 g/l.

Topcem Pronto: Ready to use normal setting controlled-shrinkage mortar for quick-drying screeds (4 days). Simply mix with water as per the Technical Data Sheet.

- VOC content: 0.01 g/l.

Planicrete SP: Multipurpose latex additive for screed mortars and cementitious adhesives.

- VOC content: 0.11 g/l.

2.3 MAPEI MEMBRANE SYSTEMS

Liquid applied membranes

Plastimul: Solvent-free bitumen waterproofing emulsion for general purpose use. For horizontal and vertical surfaces. For foundations, retaining walls, layers beneath tiles etc.

- VOC Content: 4.1 g/l.

Aquaflex Roof Grey: Ready to use, flexible liquid membrane with fibres for continuous waterproofing layers on exposed external surfaces.

- VOC Content: 3.8 g/l.

Aquaflex Roof HR: Fibre-filled liquid membrane in water emulsion with high solar reflectance and thermal emittance with a high SRI solar reflectance index (105). Ready for use. Lowers the surface temperature of the roof by more than 50% compare with dark coloured roofs. For continuous exposed waterproofing layers. High reflectance white colour.

- VOC Content: 54.9 g/l.

Mapelastic AquaDefense: Ready-to-use, flexible, liquid waterproofing membrane. Solvent-free. Ultra-quick drying. For internal and external waterproofing applications. Ceramic and stone material may be applied after only 4 hours.

- VOC content: 54 g/l.

- Classification to AS/NZS 4858: Class III.

Cementitious waterproofing membrane

Mapelastic Smart: Two-component, high flexibility cementitious waterproofing membrane for protection and waterproofing in both internal and external applications. Used in conjunction with Mapenet 150, Mapeband SA or Mapetex Sel. Mapelastic Smart may be also used on surfaces particularly stressed or crazed and helps to improve both elongation at break and crack bridging.

- VOC content: 0 g/l.

- Classification:

. To AS/NZS 4858: Class II.

. To AS 4654.1: Non-exposed waterproofing membrane.

Mapelastic Foundation: Two-component flexible cementitious mortar for waterproofing concrete surfaces subject to negative or positive hydrostatic pressure. For foundation walls, car parks, environments below ground level, water channels and swimming pools. To be applied by roller or spray. For horizontal and vertical surfaces at a thickness of at least 2 mm.

- VOC content: 0 g/l.

Idrosilex Pronto: Osmotic cementitious mortar suitable for contact with drinking water. For waterproofing foundations, walls, cellars, basements, lift-rooms, swimming pools, canals and reservoirs. Also, safe for use on containers holding drinking water. To be applied by brush, trowel or roller.

- VOC content: 0.01 g/l.

Pre-applied membrane reinforcing

Mapenet 150: Alkali-resistant glass fibre mesh for reinforcing protective waterproofing layers. Anti-fracture membranes and thermal insulation systems.

Application: Reinforcing waterproof protective layers; protective, flexible smoothing layers; particularly stressed area in waterproofing layers; anti-fracture membranes and repair of crack bitumen membranes.

Mapei Mapetex Sel: Non-woven, macro-holed polypropylene fabric for reinforcing waterproofing membranes.

Application: Used together with Mapelastic and Mapelastic Smart for waterproofing and protecting new concrete surfaces, or those repaired using products from the Mapegrout or Planitop ranges of products, and concrete units particularly subject to large deformations and, therefore, at risk of cracking. Mapetex Sel may also be used together with Mapegum WPS for internal waterproofing applications.

2.4 MAPEI TAPES

Joint and fillet tape

Mapeband: Rubber tape with alkali-resistant fabric for cementitious waterproofing systems.

Mapeband TPE: TPE tape for flexible sealing and waterproofing structural joints subject to movements up to 5 or 10 mm. For expansion joints in road-works, water tunnels and covering applications.

Mapeband SA: Self-adhesive butyl tape with alkali-resistant, non-woven fabric for elastic waterproofing systems.

Hydraulic binder for waterproofing

Lamposilex: Ultra-fast setting and drying hydraulic binder for plugging water leaks. Use to plug any source of water even under pressure in basements, tunnels, subways, etc. For sealing watertight rigid joints in hydraulic concrete structures, sewers, tanks and canals.

- VOC Content: 0 g/l.

Waterproofing sealant

Mapeflex PU 45 FT: One-component, thixotropic polyurethane sealant and adhesive. Single product for flexible bonds and seals. High modulus of elasticity, high resistance to traffic. High sucker effect for bonding on vertical surfaces and ceilings. Paintable with high bond strength, no primer required. Compatible with all absorbent mineral substrates, metal surfaces, varnished surfaces, wood, stone, brickwork and glass. Available in silver grey (111), (300 ml); silver grey (111) (600 ml). Ideal for sealing civil and industrial floors and flexible bonding of construction features instead of using screws, nails and lightweight fittings.

- VOC Content: 0.6 g/l
- Classification to ISO 11600: Class F25 LM.
- -Colour: [complete/delete]

Complies to EN 15651-1 and EN 15651-4.

Mapeflex PU 40: Paintable polyurethane sealant with a low modulus of elasticity for movements up to 25%. Internal and external, horizontal or vertical applications.

- VOC Content: 2.1 g/l
- Classification to ISO 11600: Class F20 HM.
- -Colour: [complete/delete]

Complies to EN 15651-1 and EN 15651-4.

Mapeproof Swell: Hydro-expansive, rubber-based hydrophilic sealant paste in tubes applied using an extrusion gun.

2.5 ACCESSORIES

Internal roof outlets

General: Proprietary funnel shaped sump cast into the roof slab, set flush with membrane, with a flat removable grating and provision for sealing the membrane into the base of the outlet.

e.g. A clamp ring.

Material: [complete/delete]

e.g. Cast iron or Bronze.

Grating: [complete/delete]

e.g. Flat or Domed.

Flashing

Pressure seal flashing: [complete/delete]

Proprietary item or as detailed with an aluminium angle.

Fixing: [complete/delete]

Surface fixed and sealed or fixed to cast in reglets.

Sealant: [complete/delete]

Refer to NATSPEC TECHnote DES 017 on the selection of sealants.

Control joint covers

Proprietary item: [complete/delete]

Select product appropriate for traffic, e.g. pedestrian or vehicular.

Corners, crossovers, tees and bends: Factory mitred, welded and provided with 500 mm legs.

End closures: Factory folded and sealed to match joint cover profile.

Fixing hobs: [complete/delete]

Select concrete or timber.

2.6 THERMAL INSULATION

Insulation boards

Description: [complete/delete]

For example, 100 mm thick 175 kg/m³ density rockwool sheets or 25 mm thick 32 kg/m³ density extruded polystyrene sheets. Use polyisocyanurate insulated foil faced board for fully adhered systems.

2.7 PROTECTION

Protection board

Description: [complete/delete]

For example, extruded polystyrene foam sheet (usually supplied in thin fan-folded sheets), hollow twin wall plastic board manufactured from lightweight extruded polypropylene (Corflute) or fibre cement sheet.

2.8 SLIP SHEETS

Sheet material

Description: [complete/delete]

For example, 1 layer of 300 µm thick polyethylene sheet or 1 layer of 130 g/m² geotextile sheet.

Function: Isolates the movement of overlying finishes such as screeds from the membrane.

2.9 DRAINAGE CELL PANELS

Walls

Material: [complete/delete]

Product and thickness.

Cell panel protection: [complete/delete]

If required, the product recommended by the cell panel supplier.

Filter: [complete/delete]

Geotextile product of the recommended grade to suit the fill material. Delete if filter is integral with the drainage cell panels specified.

Location: [complete/delete]

Refer to **Subsoil drains**, 0802 Hydraulic design and install for groundwater disposal.

Planter bases

Material: [complete/delete]

Product and thickness.

Protection: [complete/delete]

The product recommended by the membrane supplier.

Filter: [complete/delete]

Geotextile product of the recommended grade to suit the soil.

3 EXECUTION

3.1 PREPARATION

Substrates

General: Prepare substrates as follows:

- Fill all cracks in substrates wider than 1.5 mm with a filler compatible with the membrane system.
- Fill voids and hollows in concrete substrates with a concrete mix not stronger than the substrate.
- Remove projections.
- Remove deleterious and loose material.
- Remove all traces of a concrete curing compound if used.

Delete the reference to the curing compound if it is demonstrated to be compatible with the membrane.

- Leave the surface free of contaminants, clean and dust free.

Concrete substrates: Cure for more than 28 days.

Refer to the manufacturers substrate curing time requirements for the membrane system being used.

- Concrete substrates for Mapei products: Uniformly dry, solid, sound, and free of dust, loose particles, cracks, paint, wax, oil, rust, traces of gypsum and other products that can interfere with bonding. Prepare to the Mapei Technical Data Sheets (TDS).

Moisture content

Requirement: Verify that the moisture content of the substrate is compatible with the water vapour transmission rate of the membrane system by testing to AS 1884 Appendix A.

Refer to NATSPEC TECHnote DES 008 on the preparation of concrete substrates. Refer also to CCAA Data Sheet Moisture in concrete and moisture-sensitive finishes and coatings.

Falls

Requirement: Verify that falls in substrates are greater than 1:80.

Consult the membrane supplier to determine a fall that minimises ponding at lapped seams.

Joints and fillets

Internal corners: [complete/delete]

Select: Provide 45° fillets 50 x 50 mm or a Double detail joint.

Fillet material: [complete/delete]

Select hardwood or plastic for 45° fillets, or nominate the membrane for double detail joints.

External corners: Round or arris edges.

Control joints: Prepare all substrate joints to suit the membrane system.

Priming

Compatibility: If required, prime the substrates with compatible primers for adhesion of the membrane system.

Refer product technical data sheet.

3.2 APPLICATION

Protection during installation

Damage: Protect membrane from damage during installation and for the period after installation until the membrane achieves its service characteristics that resist damage.

For example, until liquid applied membranes have fully cured.

Drains

See AS 4654.2 clause 2.10.

General: Prevent moisture from tracking under the membranes at drainage locations.

Drains and cages: Provide removable grates or cages to prevent blockage from debris. If the finished surface is above the level of the membrane, provide a slotted extension piece to bring the grate up to the level of the finished surface.

Overflows: Apply a bond breaker to the perimeter of the overflow outlet at its junction with the surface to which the membrane will be fixed. Turn the membranes into the overflow to prevent moisture from tracking behind the membrane.

Alternatively, fit a pre-formed overflow outlet fitting with a face mounted flange and bond membrane to flange.

See AS 4654.2 clause 2.11 on overflows.

Sheet membrane joints

Orientation of laps: Lap sheets on the upslope side of the roof fall over sheets on the downslope side.

End laps generally: Stagger end lap joints.

Bituminous sheet membranes:

- Side laps: 75 mm.
- End laps: 100 mm.
- Method: Heat welded.

Synthetic rubber membranes:

- Factory-vulcanized laps: More than 40 mm.
- Field side laps: More than 50 mm for side laps.
- Field end-laps: More than 100 mm for end laps.

PVC membranes:

- Factory welded laps: More than 30 mm.
- Field-welded laps:
 - . If used over insulation boards: More than 100 mm.
 - . Other instances: More than 75 mm overlaps.

Curing of liquid applied systems

General: To Mapei recommendations.

Control of movement

See AS 4654.2 clause 2.9 on major control joints. Consult the membrane supplier for the preparation of details and selection of products to ensure their ability to withstand the expected long term movements of joints and the substrate.

General: Provide control joints located over control joints in the substructure.

Fillets and bond breakers: Size to allow the membrane to accommodate movement.

Backing rod: [complete/delete]

e.g. Closed cell polyethylene foam with 25% to 50% compression.

Joint Sealant: [complete/delete]

Select a sealant that is compatible with the membrane type and to the manufacturer's recommendations.

Joint backing gutter: [complete/delete]

Consider for joints in critical locations. Fix a formed metal gutter to one side of the soffit directly below the joint and fall to a suitable disposal or drainage point.

Control joint covers: Install after fixing hobs and membranes.

Bonded membranes: Carry control joints in the substrate through to and into the surface finish.

Membrane terminations

Membrane upturns: Provide upturns above the maximum water level expected from the exposure conditions of rainfall intensity and wind.

- Height: To AS 4654.2 Appendix A, Table A1.

See AS 4654.2 clause 2.8.1 and Appendix A for termination heights ranging from 40 to 180 mm.

- Anchoring: Secure sheet membranes along the top edge.
- Edge protection: Protect edges of the membrane.

Vertical upward terminations: [complete/delete]

For sheet membranes: Terminate under an overflashing, or specify a pressure seal overflashing or an overflashing fixed into a cast-in reglet as detailed on the drawings.

For liquid membranes: Terminate under an overflashing, or specify an overflashing of liquid applied membrane as detailed on the drawings.

If vertical terminations are not shown on the drawings, describe them in detail here.

- Waterproofing above vertical terminations: Waterproof the structure above the termination to prevent moisture entry behind the membrane using cavity flashings, capping, waterproof membranes or waterproof coatings.

Vertical downward terminations: [complete/delete]

See AS 4654.2 clause 2.8.2.

For sheet membranes select pressure seal overflashing as detailed on the drawings.

For liquid membranes extend membrane to the underside of a horizontal return as detailed on the drawings.

If vertical terminations are not shown on the drawings, describe them in detail here.

Horizontal terminations: Do not provide. Use vertical terminations.

Membrane vertical penetrations

See AS 4654.2 clause 2.8.4 for drawn details.

Pipes, balustrades, ducts, and vents: Provide separate sleeves for all pipes, ducts, and vents and have them fixed to the substrate.

Membrane horizontal penetrations

See AS 4654.2 clause 2.8.4 for drawn details.

Sleeves: Protect rigid PVC-U conduits and pipes with a sleeve of SBS bitumen in order to seal to the membrane without burning the PVC-U. Do not use high density polyethylene (HDPE), polypropylene (PP) pipes or flexible PVC conduit.

Adhesion to HDPE and PP is very poor, and flexible PVC conduit has low temperature resistance. Specify copper if seeking to minimise PVC.

Penetrations: Consult the membrane supplier for the preparation of details and selection of products, e.g. preformed linings or flashings. Penetrations through the waterproofing system should be avoided. When they are unavoidable design the detail to ensure the system is watertight and durable.

Membrane at balcony doors and windows

See AS 4654.2 clause 2.8.3 for drawn details.

Requirement: Install membrane before the fixing of door or window frames.

Membrane upturn:

- Vertical height above external finished floor level: [complete/delete]

See AS 4654.2 Appendix A Table A1 for termination heights ranging from 40 to 180 mm.

Hobless and flush thresholds: Install membrane before the fixing of door or window frames with a continuous grated drain abutting the external face of the door or window sill.

Membrane around skylights and hatches

Requirement: Install membranes to upstands before the installation of the skylight or hatch.

Upstand height above roof surface: [complete/delete]

e.g. 150 mm.

Membrane at parapets

See AS 4654.2 clause 2.8.2.2 for drawn details.

Requirement: Terminate membrane upstands under parapet flashing or capping giving 75 mm overlap. Do not top fix parapet cappings. Seal heads of fasteners against capping.

Membrane at gutters

See AS 4654.2 clause 2.8.2.3 for drawn details.

Requirement: Terminate membrane over a corrosion resistant metal angle fixed to the gutter support substrate with the vertical leg of the angle turned down into the gutter at least 35 mm.

Membrane at post supports

See AS 4654.2 clause 2.8.4 for drawn details.

Post supports fixed before/after membrane: [complete/delete]

Select from the following options, edit prompt and cross reference to a detail drawing:

Post supports fixed before membrane: Fix post support to substrate with countersunk fasteners and seal the perimeter of the baseplate to the substrate. Layout membrane sheets to minimise cuts around the post support vertical member. Dress the membrane closely around the post support and seal the edge of the penetration to the vertical member. Fix an overflashing of membrane so that any join is staggered as much as possible relative to joins in the base membrane, and which overlaps it at least 150 mm beyond the perimeter of the baseplate.

Post supports fixed after membrane: Fix post support to substrate with countersunk fasteners over a waterproof resilient gasket cut to match the shape of the baseplate, and seal the perimeter of the baseplate to the membrane. Fix an overflashing of membrane which overlaps the base membrane at least 150 mm beyond the perimeter of the baseplate. Dress the overflashing closely around the post support and seal the edge of the penetration to the vertical member.

Membrane to planter boxes

See AS 4654.2 clause 2.13 for drawn details.

Membrane: Extend root-resistant membrane at least 100 mm vertically above the soil fill level and secure.

For aggressive root systems and trees, the selected membrane system should be tested and certified for root resistance by the manufacturer. Root resistance may be built into waterproofing membranes either by the addition of root-inhibiting chemical treatments, or because the composition of the membrane provides an impenetrable barrier to root growth.

Drainage: Grade the base of the planter to adequately sized drainage outlets and terminate the membrane in the outlets.

Drainage riser: Install a riser with drainage slots that extend from the membrane level to the top of the drainage cell. Extend the riser above the soil fill level and finish with a screw cap to provide access for drain clearing.

Protection board: Provide protection board to the full extent of the membrane including areas between soil level and the underside of flashings and cappings.

Drainage cell: Provide geo-filter fabric wrapped drainage cell to the base of the planter and turn geo-filter fabric up drainage riser at least 100 mm above drainage slots.

Cappings and flashings: Provide capping to the tops of planter walls to protect the membrane. Extend the capping to overlap the top of the protection board on the inside face of the planter wall. Where planter walls abut other walls, provide a flashing over the top of the membrane.

Membrane to below ground structures

Membrane: Externally apply membrane to all walls and return to horizontal surfaces to prevent water tracking around structure at joints and corners.

Protection board: Provide protection board to the full extent of the membrane.

Protection boards can be self-adhesive to ensure they remain in situ prior to back filling. Ensure that there are no materials used requiring mechanical fixing to the membrane. When backfilling and using hard edged drainage cell, protect the membrane with a 6 mm thick layer of reconstituted rubber mat protection sheet.

Drainage cell: Provide geo-filter fabric wrapped drainage cell to vertical surfaces of the structure.

Reinforcement: Provide reinforcement to the membrane at junctions, corners and over joints to the manufacturer's recommendations.

Overlaying finishes on membranes

Compatibility: If a membrane is to be overlaid with another system such as tiles, pavers, ballast, insulation or soil, provide an overlaying system that is compatible with and will not cause damage to the membrane.

Bonded or partially bonded systems: If the topping or bedding mortar is to be bonded to the membrane, provide sufficient control joints in the topping or bedding mortar to reduce the movement over the membrane.

Slip sheet: If the topping or bedding mortar is structurally sufficient not to require bonding to the substrate, lay a double slip sheet over the membrane to separate it from the topping or bedding mortar.

Paint coatings: If maintenance pathways are indicated by a paving paint, use a paving paint which is compatible with the membrane.

Membrane protection boards:

- Installation: [complete/delete]

If flood testing is specified: Immediately after the successful conclusion of flood testing. Otherwise: Immediately after the installation of the membrane.

- Location: [complete/delete]
- Fixing: [complete/delete]

Multi-layer APP modified bitumen systems: Adhere to the membrane with a solvent-free or low melt bitumen adhesive. Provide a gap no greater than 6 mm at joints between extruded polystyrene foam (XPS) boards.

Single layer SBS modified bitumen systems: Adhere to membrane by spot torching the membrane to the XPS board (i.e. by applying the torch to the membrane, not the board). Polypropylene board provides very poor adhesion, so it may be necessary to use mechanical fixings, taking care not to affect waterproofing.

Liquid applied membrane: Tape joints and fix with an adhesive compatible with the membrane.

3.3 TESTING

Flood test

A flood test may be required where the waterproofed area is over a habitable space particularly that of another occupant. However it should be noted that most membrane system failures are due to damage caused on site after the flood test is conducted. Delete if not required.

Application: Perform a flood test before the installation of surface finishes.

Moisture content measurement method: Conform to AS 1884 Appendix A

Set-up:

- Measure the wall/floor junction of adjacent spaces and of the slab soffit below for dryness.
- Record the result for each area.
- Dam the access openings and seal drainage outlets to allow 50 mm water level but no higher than 25 mm below the weir level of the perimeter flashings.
- Provide temporary overflows of the same capacity as the roof outlets to maintain the flood level.

The aim is to prevent damage if it rains overnight. If the building is occupied consider calling for the flood test to be conducted during supervised working hours.

- Fill space with clean water and leave overnight.

Evaluation:

- Make a visual inspection of the wall/floor junction of adjacent spaces and of the slab soffit below for obvious water or moisture.
- Test the same areas for dryness using a moisture meter, and compare the results to the measurements taken before flooding.

Conformance:

- Evidence of water from the visual test: Failure.
- No visual evidence of water: Proceed with the moisture meter test.
- Increase in test results before and after flooding: Failure.

Records: Submit records of all flood tests.

Specify here the approval criteria set up for the project. If necessary nominate a **Hold point**.

3.4 COMPLETION

Protection

General: Keep traffic off membrane surfaces until bonding has set or for 24 hours after laying, whichever period is the longer.

Reinstatement: Repair or replace faulty or damaged work. If the work cannot be repaired satisfactorily, replace the whole area affected.

Warranties

Materials:

- Form: Mapei product warranty.
- Period: 10 years.

Workmanship:

- Form: Against failure of execution under normal environment and use conditions.
- Period: [complete/delete].

4 SELECTIONS

Schedules are a way of documenting a selection of proprietary or generic products or systems by their properties. Indicate their locations here and/or on the drawings. Refer to NATSPEC TECHnote GEN 024 for guidance on using and editing schedules.

4.1 EXTERNAL WATERPROOFING

Requirements schedule

Property	A	B	C
Traffic			
Nature of traffic			
Slip resistance classification			
Overlaying finish			
Root and bioresistance			

A, B, C: These designate each instance or type or location of the item scheduled. Edit to align with the project's codes or tags.

Edit codes in the **Schedule** to match those on drawings.

Traffic: Nominate Trafficable or Non-trafficable.

Nature of traffic: For trafficable surfaces nominate maintenance, pedestrian or vehicular as defined in AS 4654.1 clause 1.3.7 and AS 4654.2 clause 1.3.14.

Slip resistance classification: For trafficable surfaces only. Delete for non-trafficable surfaces. Select the slip resistance classification to AS 4586. See NATSPEC TECHnote DES 001, SAA HB 197 and SAA HB 198.

Overlaying finish: Nominate the finish by reference to the appropriate worksection or put none. Note: Roofing membranes are generally not trafficable.

Root and bioresistance: Nominate for planters, roof gardens and tanking where resistance to roots, fungus, mould and rot is required. To AS 4654.1 clauses 2.8 and 2.9. Required to all systems.

Single layer sheet system schedule

Property	A	B	C
Proprietary system			
System type			
Sheet type			
Sheet thickness (mm)			
Base weight (kg/m ²)			
Tensile strength (minimum) (MPa)			

Property	A	B	C
Breaking strength (N)			
Tensile strain (elongation at break) (%)			
Modulus at 300% elongation (MPa)			
Permeability (g.m ² /d)			
Method of fixing to substrate			
Thermal insulation type			
Surface finish			
Abrasion resistance			

A, B, C: These designate each instance or type or location of the item scheduled. Edit to align with the project's codes or tags.

Edit codes in the **Schedule** to match those on drawings.

Proprietary system: If the system is documented by proprietary name, some of the other schedule items may be unnecessary and can be deleted.

System type: e.g. Ballasted, fully bonded, partially bonded or mechanically fixed membranes, inverted roof membrane assembly (IRMA) as defined in AS 4654.2 clause 1.4.

Sheet type: e.g. Polymeric (EPDM - ethylene propylene diene monomer, butyl, etc.), Polymer modified bitumen.

Thickness: The nominal thickness of the membrane, without ancillary layers such as protection or release layers.

Method of fixing to substrate: e.g. Proprietary adhesive, Heat weld.

Thermal insulation type: e.g. one of the types specified in *0471 Thermal insulation and pliable membranes*. Some proprietary extruded polystyrene boards are recommended by the manufacturer for applying above the membrane (with suitable protection) to form an inverted roof insulation system.

Surface finish: e.g. Self-finished, or Proprietary protective cap sheet.

Abrasion resistance: Nominate Non-trafficable for areas accessible for maintenance only. For trafficable areas, nominate pedestrian traffic only, Occasional service vehicle traffic or Regular vehicle traffic.

Multi-layer sheet system schedule

Property	A	B	C
Proprietary system			
Number of layers			
Material type			
Vent sheet			
Base layer			
Intermediate layer			
Top layer			
Bonding agent			
Method of laying			
Thermal insulation type			
Surface protection/finish			

A, B, C: These designate each instance or type or location of the item scheduled. Edit to align with the project's codes or tags.

Edit codes in the **Schedule** to match those on drawings.

Proprietary system: If the system is documented by proprietary name, some of the other schedule items may be unnecessary and can be deleted.

Material type: AS 4654.1 deals with material properties and does not list generic material types. It is advisable to consult manufacturers on currently available products.

If individual layer properties that make up a multi-layer system are required, then list the properties from those in the single layer schedule as required.

Top layer: Specify the grade and type of fabric for each layer.

Bonding agent: e.g. Hot bitumen, Cold bitumen adhesive.

Method of laying: e.g. Separate layer, Shingle.

Thermal insulation type: e.g. one of the types specified in *0471 Thermal insulation and pliable membranes*. Some proprietary extruded polystyrene boards are recommended by the manufacturer for applying above the membrane (with suitable protection) to form an inverted roof insulation system.

Surface protection/finish: e.g. bituminous paint, mineral aggregate, fibre cement sheets, no fines topping, concrete pavers. Consult roof system manufacturers.

Planters

Property	A	B	C
Membrane	Plastimul		
Repair mortar to radius internal horizontal/vertical corners	Mapegrout Fast-set		

A, B, C: These designate each instance or type of the item scheduled. Edit to align with the project's codes or tags.

Edit codes in the **Schedule** to match those on drawings.

Swimming pool membranes

Property	Mapei product	A	B	C
Smoothing compound, walls	Planitop Fast 330			
Smoothing compound or fast setting screed, floor	Planitop Fast 330 or Mapecem Pronto			
Cementitious waterproofer	Mapelastic Smart			
Polypropylene TNT	Mapetex Sel			
Cementitious waterproofer second layer	Mapelastic Smart			
Monolithic sealing of the coving to the substrate	Eporip+ Mapegrout Fastset			

A, B, C: These designate each instance or type of the item scheduled. Edit to align with the project's codes or tags.

Edit codes in the **Schedule** to match those on drawings.

Ceramic tile adhesive, grout and sealant: Refer to the *0181p MAPEI in adhesives, sealants and fasteners* worksection.

Balconies and terraces

Property	Mapei product	A	B	C
Bonding slurry				
Screed				
Abutment seal				
Waterproofer				

A, B, C: These designate each instance or type of the item scheduled. Edit to align with the project's codes or tags.

Edit codes in the **Schedule** to match those on drawings.

Bonding slurry: Select Planicrete SP mixed with Mapecem or Planicrete SP mixed with cement depending on the choice of screed.

Screed: Select Mapecem mixed with aggregate or Planicrete SP mixed with sand and cement.

Abutment seal: Select Mapeband rubber tape or Mapeflex PU 45 sealant.

Waterproofer: Select two coats Mapelastac AquaDefence or Mapelastac Smart.

Ceramic tile adhesive, grout and sealant: Refer to the 0181p MAPEI in adhesives, sealants and fasteners worksection.

Lift and service pits

Property	Mapei product	A	B	C
Lift shaft	Mapelastac Foundation			

A, B, C: These designate each instance or type of the item scheduled. Edit to align with the project's codes or tags.

Edit codes in the **Schedule** to match those on drawings.

Joints

Property	Mapei product	A	B	C
Structural joint	Mapeband TPE			
Construction joint	Mapeband TPE			
Through bodies				

A, B, C: These designate each instance or type of the item scheduled. Edit to align with the project's codes or tags.

Edit codes in the **Schedule** to match those on drawings.

Through bodies: Select Idrostop or Lamposilex.

REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

AS 1884	2012	Floor coverings - Resilient sheet and tiles - Installation practices
AS/NZS 3500		Plumbing and drainage
AS/NZS 3500.3	2015	Stormwater drainage
AS 4654		Waterproofing membranes for external above-ground use
AS 4654.1	2012	Materials
AS 4654.2	2012	Design and installation
AS/NZS 4858	2004	Wet area membranes
ISO 11600	2002	Building construction - Jointing products - Classification and requirements for sealants

The following documents are mentioned only in the **Guidance text**:

AS 4586	2013	Slip resistance classification of new pedestrian surface materials
SAA HB 197	1999	An introductory guide to the slip resistance of pedestrian surface materials
SAA HB 198	2014	Guide to the specification and testing of slip resistance of pedestrian surfaces
NATSPEC DES 001	2016	Slip resistance performance
NATSPEC DES 008	2015	Preparation of concrete substrates
NATSPEC DES 017	2006	Selection of sealants
NATSPEC GEN 006	2007	Product specifying and substitution
NATSPEC GEN 024	2015	Using NATSPEC selections schedules
NATSPEC TR 01	2016	Specifying ESD
EN 15651		Sealants for Non-structural use in Joints in Buildings and Pedestrian Walkways
EN 15651-1	2017	Sealants for Facade Elements
EN 15651-4	2017	Sealants for Pedestrian Walkways