

**WATERPROOFING AND TANKING**

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TABLE OF CONTENTS

01. GENERAL.....2

    01.01 SCOPE .....2

    01.02 RELATED WORK .....2

    01.03 QUALITY ASSURANCE.....2

    01.04 REFERENCES .....2

    01.05 MANUFACTURED PRODUCTS .....2

    01.06 DELIVERY, HANDLING AND STORAGE.....3

    01.07 WARRANTY .....3

02. SYSTEM DESCRIPTION .....4

    02.01 WATERPROOFING SYSTEM TYPE A.....4

    02.02 WATERPROOFING SYSTEM TYPE B.....5

03. EXECUTION .....8

    03.01 EXAMINATION .....8

    03.02 SUBSTRATES.....8

    03.03 PROJECT ADJACENT SURFACES .....8

    03.04 PROTECTION OF INSTALLED MEMBRANES .....8

    03.05 INSTALLATION OF WATERPROOFING SYSTEMS .....9

    03.06 QUALITY CONTROL – INSPECTIONS .....9

    03.07 CLEANING .....9

    03.08 INSTALLATION OF WATERPROOFING SYSTEMS .....9

    03.09 TESTING REPORTS.....9

    03.10 CLEANING .....10

    03.11 COMPLETION .....10

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**WATERPROOFING AND TANKING**

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**01. GENERAL**

**01.01 SCOPE**

This trade section identifies requirements for the supply and installation of 4 different types and areas of waterproofing. It covers preparatory and protective work and associated materials including but not limited to:

- System Type A, Wet Area membrane as in wet rooms and similar areas.
- System Type B, Waterproofing added to concrete mix before placement.  
Refer to Concrete trade sections.

**01.02 RELATED WORK**

Co-ordinate and co-operate with the following trades:

- Concrete
- Masonry
- Surface finishes
- Roofing
- Excavation and fill
- Windows
- Concrete screeds (granolithic)

**01.03 QUALITY ASSURANCE**

Use experienced and trained installers licensed by the material manufacturer. Provide evidence of the licence to the Architect.

**01.04 REFERENCES**

Comply with applicable portions of the following Australian Standards:

<b>CODE</b>	<b>REFERENCE</b>
AS 1884 2012	Floor coverings – Resilient sheet and tiles – Laying and maintenance practices.
AS 3600 2009	Concrete structures. <i>Plus 2 Amdts, 2010, 2013, 1 Supplement 2014.</i>
AS 3740 2010	Waterproofing of domestic wet areas. <i>1 Amdt, 2012</i>
AS 3799 1998	Liquid membrane-forming curing compounds for concrete.
AS 4654	Waterproofing and membranes for external above-ground use
4654.1 2012	Materials
4654.2 2012	Design and installation
AS/NZS 4858 2004	Wet area membranes.

**01.05 MANUFACTURED PRODUCTS**

Identification of a particular manufacturer's product does not exclude alternative products by others. It is a quality standard required to be met.

Submit request for alternatives to be approved to the Architect with full description including recommended installation procedures and procedures relating to Occupational Health and Safety of applicators and other site personnel.

Do not order materials until written approval of alternatives has been received.

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**WATERPROOFING AND TANKING**

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Submit manufacturer's approval of installers where manufacturer's own licensed installers are not employed and a warranty is required.

**01.06 DELIVERY, HANDLING AND STORAGE**

Keep on-site storage of materials to a minimum, delivering them as required for direct installation. Be responsible for loss and damage to delivered materials, both stockpiled and in place.

Deliver materials in sealed containers showing manufacturer's name. Arrange for inspection of materials by the Architect before using them.

**01.07 WARRANTY**

Requirement

Prior to completion of the waterproofing systems installation, provide each warranty, in the appropriate form; executed by the sub-contractor and the warrantor (or warrantors in the case of joint warranties); and for the required warranty period.

Warranty Conditions

Sub-contractor's obligations: the provision of a warranty does not relieve the sub-contractor of any of his contractual obligations.

Guarantee of performance: where the warrantor is a subsidiary of another organisation, provide that organisation's guarantee of performance of the warranty.

Adjustment of warranty period: where any part of the work is required to be repaired or made good under a warranty, the warranty period does not terminate until that part has been satisfactorily repaired or made good; and in respect of that part, recommences from the date of completion of the repair or making good.

Product warranties

Provide separate product warranties for each of the waterproofing systems.

System warranty

Provide separate warranties for each of the waterproofing systems, signed jointly by the manufacturer and the installer, stating that the products applied comply with this specification, are suitable for the conditions to which they will be subjected and were correctly installed in accordance with the manufacturer's published recommendations and details, the contract documents and provide a complete waterproof membrane.

Warrant each of the waterproofing systems against any defects that affect their performance or appearance. Defects include failure of any element of the waterproofing system, whether or not the failure causes the system not to achieve the design criteria or specified performance.

The warranty must cover the repair and/or replacement of all other building elements, finishes etc to which damage occurs as a consequence of a defect in, or repair work carried out, to the waterproofing system.

Warranty Period

As noted beside each of the waterproofing systems described in this specification.

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**WATERPROOFING AND TANKING**

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**02. SYSTEM DESCRIPTION**

**02.01 WATERPROOFING SYSTEM TYPE A**

SYSTEM TYPE A – Wet Area Membrane

Location

Refer Waterproofing Table and drawings.

Typically to floors and walls of wet areas: to wall areas immediately adjacent to and behind a bath, sink or similar fixture.

Carry the membrane under fixtures, benches and the like, and extend into the full area of bench splashback - extending 300mm beyond the horizontal extent of the designated water proof area

System

Type: liquid applied, moisture curing, polyurethane liquid membrane.

Proprietary item: Vulkem non-exposed membrane system by Tremco Pty Ltd.

Substrate

Curing: allow concrete to cure for a minimum of 28 days prior to the application of the membrane.

Cleaning: clean down the substrate surface to remove all curing agents, wax, grease, oil, dirt, dust and other foreign material and leave it clean, dry, dust free, smooth and free of undulations.

voids: patch with a non shrinking quick setting grout and allow to cure for a minimum of 7 days prior to applying the membrane.

Application

Fillet: wherever a vertical penetration or upstand occurs, install a 12mm x 12mm fillet of Tremflex PU1 at the intersection of the vertical and horizontal surfaces.

Primer: prime porous substrate (concrete/cement) typically with Vulkem 171.

Prime non-porous materials (metals/plastics) typically with Tremco Primer No 181.

Joints and penetrations: on the same day as priming, seal joints and penetrations with Vulkem 931 sealant.

First coat: on the same day as priming, apply a coat of Tremco Vulkem non-exposed membrane to a minimum wet film thickness of 1.0mm to floors and walls in a single operation. If delayed beyond that day re-prime in accordance with manufacturer's instructions.

Detailing

Detail the membrane in accordance with the manufacturer's recommendations, as shown on the drawings and as follows:

Turn the membrane down into the puddle flange of outlets.

Turn the membrane up at, and seal to, all penetrations, pipes, waste outlets, etc.

Turn the membrane up for 100mm at all walls, plinths, and other upstands.

Dress the membrane over the horizontal leg of angle tile trims at doorways and turn up the vertical face of the angle to terminate level with the bottom of the floor tiles.

Similarly, dress the membrane up the face of door jambs to terminate at the underside of the floor tiles.

The membrane turn up is to create a complete waterproof envelope to the floor area of the space being treated.

Detail the membrane at movement joints in the substrate as detailed on the drawings.

Membrane curing: allow 72 hrs for the membrane to cure prior to carrying out water tests or applying finishes, toppings etc.

Warranty

Provide a warranty for materials and application of the membrane for a period of 10 years from the date of Practical Completion, to be in a form approved by the principal.

Alternatives

Type: any proposed alternative to the system specified below is to be a proprietary liquid applied or sheet membrane system which:

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**WATERPROOFING AND TANKING**

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has a current Australian Building Product and Systems Certification Scheme certificate (Australian Building Codes Board); or  
has a current technical opinion issued by the Australian Building Systems Appraisal Council (CSIRO) stating that the system is suitable for use as a waterproofing system for use in wet areas, shower recess bases and associated floors and wall/floor junctions which are to be tiled.

**02.02 WATERPROOFING SYSTEM TYPE B**

**SYSTEM TYPE B – Xypex Additive**

**General**

Location: to all concrete up to the floor level of the ground floor.

Proprietary item: the concrete waterproofing material is to be manufactured by Concrete Waterproofing Manufacturing Pty Ltd trading as XYPEX Australia, and is to be of the cementitious crystalline type known as XYPEX Waterproofing by Crystallization.

Note: XYPEX crystalline products should not be considered to be flexible.

Storage: store manufacturer's sealed and labelled material containers off the ground in a dry enclosed area at a minimum temperature of 7°C. The shelf life is 1 year when stored under proper conditions.

Manufacturer's warranty: on-site supervision, quality procedures, testing and all other requirements for issuance of manufacturer's warranty are to be complied with. Refer document PROCEDURE FOR SUPERVISION OF XYPEX POURS by XYPEX.

**Dosage**

By weight: Percentage dosage rates of XYPEX Admix C-1000NF/C-2000NF to the cementitious (ordinary Portland Cement [O.P.C.] and reactive pozzolana {eg; reactive fly ash}) content of the concrete.

Dosage rate must be between 0.8% and 1.0% by weight of cementitious (BWC) unless otherwise specified.

Example; 230 kg O.P.C. and 75 kg Fly Ash, total cementitious = 305 kg.

Dose rate @ 0.8% = 2.44 kg and @ 1.0% = 3.05 kg.

Refer to XYPEX Dosage Chart for applicable number of bags to be dosed in regard to cementitious content. Instances where this chart does not apply require that XYPEX Australia be contacted for determination and advice.

Cement content:: the cement (o.p.c.) content of the mix is not to be less than 10% by weight.

Special applications: chemical storage and constant high water pressure applications should be referred to Xypex Australia for suitable dose rates.

**Batching and Mixing**

Batching plant procedures, facilities and manpower will dictate the preferred/required batching technique. For example it is anticipated that the method described for central mix plants is not generally feasible in Australian conditions.

**Ready Mix Plant – Dry Batch Operation:**

Prior to batching, add XYPEX Admix in powder form to the drum of the ready-mix truck. After batching, mix the materials for 2-3 minutes to ensure the Admix is distributed evenly throughout the batch. (The batch must be agitated at high speed to ensure thorough dispersion.) A minimum of 10 minutes must elapse before discharge of the concrete. A further 1 minute of mixing at high speed immediately prior to discharge is recommended.

**Ready Mix Plant – Central Mix Operation:**

Mix XYPEX: admix with water to form a thin slurry (e.g. 7.0 kg of powder mixed with 13.0 litres of water). Pour the required amount of material into the drum of the ready mixed truck. The aggregate, cement and water should be batched and mixed in the plant in accordance with

## WATERPROOFING AND TANKING

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standard practices (taking into account the quantity of water that has already been placed in the ready mix truck). Pour the concrete into the truck and mix for at least 5 minutes, to ensure even distribution of the XYPEX Admix throughout the concrete.

Pre-cast Batch Plant:

Add XYPEX Admix to the rock and sand, then mix thoroughly for 2 – 3 minutes before adding the cement and water. The total concrete mass should be blended using standard practices.

**NOTE:** It is important to obtain a homogeneous mixture of XYPEX Admix with the concrete. Therefore, do not add dry powder directly to wet concrete as this may cause clumping and thorough dispersion will not occur. It is however suitable to add wet concrete to dry powder ensuring that thorough mixing is achieved (as per Dry Batch Operation).

XYPEX soluble bags are most suited for use in the Dry Batch operation.

Maximum water cement ratio should not exceed **0.5**. Requirements for higher water cement ratios must be referred to XYPEX Australia.

The XYPEX Admix C-1000NF/ C-2000NF will act as a plasticiser and takes at least 10 minutes to become fully activated and will last approximately 30 minutes after placement of concrete.

Extension of set time may occur when using XYPEX Admix C-1000NF/C-2000NF. Amount of extension will depend on concrete mix design, temperatures and dosage rate of XYPEX. Care should be exercised when other admixtures are being used; when mixed with XYPEX extended set times can result. This category includes set retarders and may include water reducers, plasticisers etc.

Reinforcement

General: to be in accordance with the pertinent, current Australian Standards.

Concrete slabs: all reinforcement is to be "Rib deformed bar" or "welded wire fabric" (other than fitments) and designed in accordance with Australian Standard AS 3600.

Exposed concrete decks: joint free exposed concrete decks must contain reinforcement to minimise thermal movement, for which the content and placement of reinforcement steel required is to be sufficient to satisfy the requirements of AS 3600 clause 9.4.3.4. Refer AS 3600 section 4 para 4.3 (Exposure Classification) in its entirety.

Minimum steel: in the event that the requirements of AS 3600 be less than 1.0% (exposure classification A1 or A2) reinforcement steel requirement will in no case be less than 1.0% applied proportionately throughout the concrete and apportioned at not less than 0.5% on the top and 0.5% on the bottom face of the concrete. (i.e.; 0.25% either direction at both faces). 1.0% equates to a degree of crack control between moderate and strong as defined by AS 3600, clause 9.4.3.4.

Pre-stressing (Post Tensioning): is to conform to the above standards and or other current pertinent standard and requirements where applicable.

Compaction

Standard: must comply with AS 3600, clause 19.1.3.

General: the concrete is to be compacted until the following conditions are attained:

Entrapped air is expelled;

formwork is completely filled to the intended level;

all reinforcement, penetrations and the like are completely surrounded, and the required properties of the concrete are achieved.

Finishing

Standard: must comply with AS 3600, clause 19.1.4.

## WATERPROOFING AND TANKING

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General: finishing of the concrete is to include the process of "re-working" the surface of the concrete. This will involve either power trowelling of the surface and/or vigorous hand steel trowelling. Subsequent to this, finishing any desired finish can then be applied.

Alcohol: in hot weather (above 25°C) aliphatic alcohol **must** be used during placement and finishing to control the early loss of bleed water, and which may also assist in the control of shrinkage.

Curing

Standard: must comply with AS 3600, clause 19.1.5.

General: the concrete is to be cured in accordance with the above references, to enable the achievement of maximum potential XYPEX crystalline growth.

Curing should begin immediately following the final set. The use of aliphatic alcohol does not take the place of standard concrete curing practices.

In formed concrete, formwork provides good protection and curing for concrete, and should be left in place for a period of 7 days. Only exposed surfaces need to be kept moist.

Alternate Curing (AS 3799): curing compounds complying with the above and having retention levels of 90% or more are a satisfactory curing agent for XYPEX Admix C-1000NF/C-2000NF treated concrete.

Backfilling

Normal backfilling procedures, after curing of the concrete, may take place. If backfilling takes place within 7 days after the initial set, the backfilling material must be moist so as not to draw moisture from the concrete.

Applied Finishes

The crystalline formation of dendritic fibres will fill the pores and capillaries, thus reducing the suction characteristics of the concrete. Therefore, an additional bonding system may be required for the adhesion of applied finishes such as paint, epoxy, grout, cement parget coat, plaster, stucco or the like.

It is the responsibility of the installer of the applied finish to take whatever measures are necessary, including testing, to ensure acceptance by, or adhesion, to the concrete surface.

**WATERPROOFING AND TANKING**

**03. EXECUTION**

**03.01 EXAMINATION**

Examination

- Inspect conditions before delivery of materials and start of work on site to ensure that everything is satisfactory. Arrange with builder for needed rectification. Start of work means total acceptance of conditions.
- Waterproofing Table

<b>Waterproofing materials</b>	<b>Location and Extent</b>	<b>System Type A, B, C or D</b>
Vulkem non-exposed membrane system by Tremco Pty Ltd.	KITCHEN SPLAHSBACK DWC, WC, CLEANER	A
Tremproof 3000 by Tremco Pty Ltd	N/A	C

**03.02 SUBSTRATES**

Substrates for membranes

Apply membranes to dry, smooth, firm, continuous surfaces, clean and free from loose or foreign matter. Provide coving or fillets on internal corners. Round or arris external corners and edges.

Dryness tests for substrates: to AS 1884 Appendix A.

Acceptance of substrate: certify that the building structure, including the building tolerance, provision of reference lines and marks, is satisfactory for receiving the application of the waterproofing system.

Approval of installer: if the installation of the waterproofing system is not by the manufacturer, and a manufacturer's warranty is conditional on approval of the installer, then obtain the manufacturer's approval of the installer.

Make a photographic record of prepared substrates.

**03.03 PROJECT ADJACENT SURFACES**

Protect adjacent surfaces from splashes over sprays and the like during the application of the waterproof membranes.

Plug drainage holes prior to the application of waterproofing membranes to prevent the material from entering outlets beyond what is necessary to dress the material into the outlet to complete the membrane system.

Remove plugs on completion.

Protect waterproofing membranes upon completion of each area of the application and maintain that protection until such time as the installation is approved and covered up by other finishes.

**03.04 PROTECTION OF INSTALLED MEMBRANES**

Location

Protect planter boxes, retaining walls, footings and any other location where the membrane is in direct contact with backfill or other potential damaging materials.

Type

Provide protection board made from 6mm thick fibre cement or 3mm thick, hollow polypropylene, co-polymer sheet or proprietary protection board equal Tremco Pty Limited.

Installation



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## WATERPROOFING AND TANKING

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Protect waterproofing membranes upon completion of each area of the application and maintain that protection until such time as the installation is approved and covered up by other finishes.

Following completion of the waterproof membrane to planter boxes install protection board to the membrane on vertical faces.

Restrain the board by trapping the top edge under the bottom edge of the K shaped pressure flashing used to terminate the top of the membrane.

Retaining Walls and Footings

Refer to SITE PREPARATION - EXCAVATION for membrane protection to retaining walls and footings built against existing site fill or rock.

### 03.05 INSTALLATION OF WATERPROOFING SYSTEMS

Ensure tasks and activities comply with the Act, Regulation, Code of Practice or Australian Standards, as relevant.

Refer to the systems specified in Part II System Description.

Follow the specified instructions.

### 03.06 QUALITY CONTROL – INSPECTIONS

#### Notice

Give sufficient notice so that inspections can be made at the following stages:

All substrate surfaces prior to the application of the waterproofing system.

Upon delivery of the system component material on site in sealed containers, prior to opening.

At completion of the application of the waterproofing systems, and prior to covering up with other finishes.

During the carrying out of flood tests.

Minimum notice required: 3 days.

#### Manufacturers' Inspections

Arrange for and pay the cost of inspections by the waterproofing systems manufacturer at each of the above stages and at regular frequent intervals during the application of the waterproofing systems.

Maintain a logbook on the site and record the time and date of each inspection, work complete and underway, at the time of each inspection, and comments by the manufacturer's representative.

Have the manufacturer's representative sign the logbook at the completion of each inspection and record the observations made.

### 03.07 CLEANING

During the application, promptly remove foreign material from the work area without damaging the waterproofing system.

### 03.08 INSTALLATION OF WATERPROOFING SYSTEMS

Refer to the systems specified in Part II System Description.

Follow the specified instructions.

### 03.09 TESTING REPORTS

Test installations prior to application of finishes to membranes.

To each membrane in wet areas, test 20% of area of membrane with a minimum of 10 tests.

Submit a report on the preparation of areas to be treated, working progress and on completion. In each report include a photographic record.

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**WATERPROOFING AND TANKING**

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**03.10 CLEANING**

Thoroughly clean work on completion, including affected adjacent surfaces.

**03.11 COMPLETION**

Complete contracted work in accordance with contract documents and written variation orders issued by the Architect.