

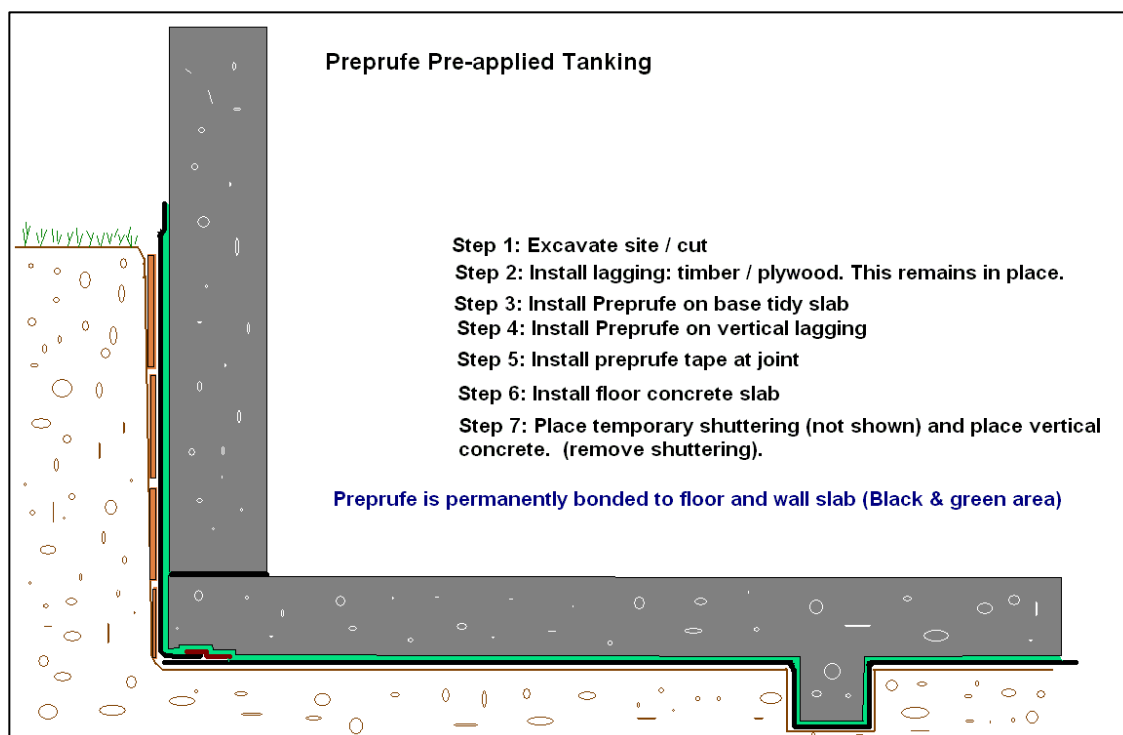
MANUAL SECTION	ISSUE DATE	AUTHORISED	REPLACES	PAGE
Waterproofing	March 2008	PM	Feb 2006	Page1

## Preprufe 160 Sheet Tanking and Waterproofing Membrane

**Description** Bituthene Preprufe 160 is a DPM (damp proof membrane) consisting of a modified heavy duty sheet comprising of modified adhesive on a heavy polyethylene face which is a continuous reinforcement. It is pre-applied to the site and concrete is poured against Preprufe within formwork. The concrete fully bonds to the adhesive resulting in a fully adhered membrane to the floors and walls of a sub-ground structure.

**Application areas:**

- DPM or below grade tanking (walls buried below ground). Preprufe 160 prevents water from entering the wall or building structure from the ground. Used behind walls or under floor slabs.
- Under floor slabs
- Behind poured in-situ concrete



**Features**

- **Compliant product with E2/AS1** July 2005; section 12.0, 12.2.2.b
- Used in New Zealand for over 5 years
- Compliant with **BRANZ bulletin #397**, Waterproofing basements; section 5.2.2
- **B2 50 Year durability** compliant; "Life of the building" (refer BBA approval).
- ...cont..

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<b>H A M I L T O N</b>	<b>P A L M E R S T O N</b>	<b>N O R T H</b>	<b>W E L L I N G T O N</b>	<b>C H R I S T C H U R C H</b>
Telephone: 0-7-847 8658	Telephone: 0-6-353 3685	Telephone: 0-4-477 7040	Telephone: 0-3-366 6802	
Fax: 0-7-847 3766	Fax: 0-6-353 3632	Fax: 0-4-477 7039	Fax: 0-3-379 0279	

- BBA approval (British Board of Agreement). Grades 2,3 &4. BS8102:1990
- All joints sealed by permanent self adhesive.
- Elongation: 300% min, ASTM D412
- Moisture Vapour Transmission: Zero, 0 gram/day. BS3177:1995
- Permeability:  $K < 1.4 \times 10^{-11} \text{ cm.s}^{-1}$ . ASTM D5084-90
- Fully bonds to concrete: will not fall away if ground collapses, settles or dries out. Forms an integral seal with the concrete.
- Not reliant on confinement.

## Materials

Preprufe 160 roll 1.2 x 35m, 0.8mm thick (incls 0.4mm HDPE)  
 Preprufe Tape roll 15 x 0.1m  
 Bituthene liquid membrane (part polyurethane for sealing around penetrations.)

## Producer Statement

Preprufe 160 complies with the requirements of the NZ building code and any relating acts. Preprufe 160 complies with E2/AS1 2005 and durability under B2. The conditions under B2 (50years durability for elements that are inaccessible) are accepted and complied with providing all preparation and installation is carried out by Nuplex licenced contractors and all product installation details are followed.

## PREPRUFE 160 – PRE-APPLIED SHEET BELOW GRADE TANKING

### Substrates

- All surfaces are to be sound and solid to eliminate movement during concrete placement. Substrate must be regular and smooth with no gaps or voids greater than 12mm. Grout around all penetrations such as utility conduits for stability.

**Floor slabs** – Monolithic (site) concrete blinding, sand or mud slab is preferred. The blinding must be free of loose aggregate and sharp protrusions. An angular profiled blinding is recommended rather than a sloping or rounded substrate. Surfaces do not need to be dry but standing water must be removed to prevent overlaps being contaminated and waterproofing properties compromised.

**Walls** – Use concrete, plywood insulation, Hydroduct drainage system or other approved facing to sheet piling or other retaining structure to provide support for the membrane. Board systems such as timber lagging must be close butted to provide support and not more than 12mm out of alignment.

The Preprufe is loose laid against the wall. The sides are self adhesive. The top edge can be nailed, power fastened, metal strip etc. Take care to protect this edge as it will need flashing and/or connection to other waterproofing

### Installation

- Install Bituthene Preprufe membrane to all areas required to achieve a waterproof finish in accordance with the Grace technical data "Preprufe Foundation Protection". Temperatures must be greater than -4°C or above during installation:

- Ensure HDPE film facing the prepared substrate and the treated white coating surface facing the new concrete.

- End laps are to be staggered to avoid build up of layers.

- Accurately position sheets to overlap the previous sheet a minimum of 75mm (side and end laps) along the selvedge. Underside of sheet must be clean, dry and free from contamination before attempting to overlap. Peel back the plastic release liner from between the overlaps as the two layers are bonded together. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller.

- Secure the top of the membrane in vertical applications using a batten such as a termination bar or fixing 50mm below the top edge.

- For vertical lengths greater than 2.4 metres mechanically fasten vertical laps at 0.6m intervals using flat head nails or fixings suitable for the substrate. Fixings are to be placed through the selvedge so that the

membrane lays flat to enable heavy rolling. Fixings within the sheet must be covered with a patch of Preprufe Tape.

- Complete all cut ends or laps using Preprufe Tape. Preprufe Tape must be centered on laps.
- Completely remove the plastic release liner to expose the protective coating before placing the concrete. Any initial tack will disappear.
- Complete and seal all penetrations using Preprufe membrane and Preprufe tape. Mix and apply Bituthene LM3000 liquid membrane around all penetrations and detailed areas using a fillet to provide a watertight seal.
- Inspect the Preprufe membrane prior to placement of the concrete and carry out repairs as necessary using Preprufe Tape and Preprufe membrane. Ensure repair extends 150mm beyond damaged areas.
- Dirty areas can be cleaned by wiping with a damp cloth or low pressure water jet if required.
- Concrete must be placed within 40 days of removing the protective release liner.
- Install steel reinforcing as required.
- Concrete must be placed and compacted carefully to avoid damaging the Bituthene Preprufe membrane. Formwork is to remain in position until the concrete has gained sufficient strength to develop the bond with the Preprufe membrane.
- Seal top edge, penetrations, and detail work using Bituthene LM 3000 liquid membrane.

**Note the following:**

*Must be installed by Licensed Nuplex Contractors who are members of The Nuplex Contractors Federation Inc.*

*Top of the Bituthene Preprufe is to extend a minimum 150mm above ground level.*

*Check Bituthene Preprufe Membrane for faults or damage prior to placement of the concrete*

*Ensure finished ground surface falls away from the membrane a minimum 1:30 to divert ground water.*

**Drainage**

*Where required Bituthene Preprufe can be applied over a drainage medium such a Bituthene Hydroduct.*

*Install minimum 100 mm dia drain with openings to collect water at the base of the wall.*

*Drain is to be placed 200mm below the interior basement floor level.*

*Drain must have minimum 1:200 fall to the outlet.*

**General**

*Bituthene Preprufe can be used in conjunction with other Bituthene waterproofing/ tanking materials.*

*Bituthene Preprufe when used in conjunction with other Bituthene Products must positively seal with floor DPM and have adequate drainage installed.*



## Grace Building Envelope Systems

### Preprufe® 300R & 160R

Pre-applied Waterproofing Membranes That Bond Integrally To Poured Concrete For Use Below Slabs Or Behind Basement Walls On Confined Sites

#### Advantages

- Forms a unique integral seal to concrete poured against it. This prevents water migration and makes it unaffected by ground settlement beneath slabs.
- Fully-adhered watertight laps and detailing
- Provides a barrier to water, moisture and gas – physically isolates the structure from the surrounding ground.
- BBA Certified for basement Grades 2, 3, & 4 to BS 8102:1990
- Zero permeance to moisture
- Solar reflective - reduced temperature gain
- Simple and quick to install, requiring no priming or fillets.
- Can be applied to permanent formwork - allows maximum use of confined sites.
- Self protecting - can be trafficked immediately after application and ready for immediate placing of reinforcement.
- Unaffected by wet conditions - cannot activate prematurely.
- Inherently waterproof, non-reactive system:
  - not reliant on confining pressures or hydration
  - unaffected by freeze/thaw, wet/dry cycling
- Chemically resistant, effective in all types of soils and waters - protects structure from salt or sulphate attack.

#### Description

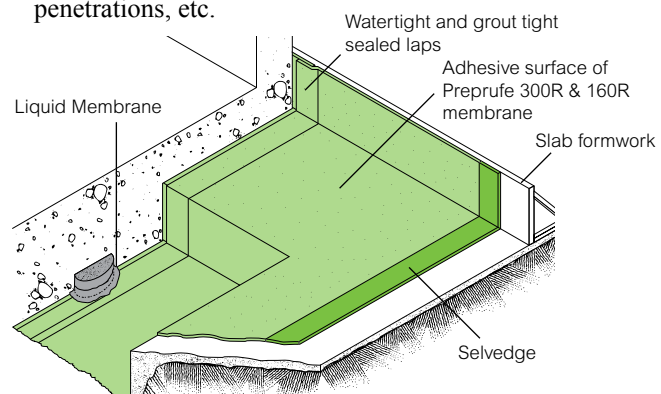
Preprufe® 300R & 160R membranes are unique composite sheets comprising a thick HDPE film, an aggressive pressure sensitive adhesive and a weather resistant protective coating. Unlike conventional non-adhering membranes, which are vulnerable to water ingress tracking between the unbonded membrane and structure, the unique Preprufe seal to concrete prevents any ingress or migration of water around the structure.

#### The Preprufe R System includes:

- Preprufe 300R - heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to

accept the placing of heavy reinforcement using conventional concrete spacers.

- Preprufe 160R - thinner grade for lighter applications and reverse tanking (i.e. blindside zero property line) applications against permanent formwork such as soil retention systems.
- Preprufe Tape LT - for covering cut edges, roll ends, penetrations and detailing (temperatures between -4°C and +30°C).
- Preprufe Tape HC - as above for use in Hot Climates (minimum 10°C).
- Liquid Membrane - for sealing around penetrations, etc.



Preprufe 300R & 160R membranes are applied either horizontally to smooth prepared concrete or well rolled and compacted sand or crushed stone blinding; or vertically to permanent formwork or adjoining structures. Concrete is then cast directly against the adhesive side of the membranes. The specially developed Preprufe adhesive layers work together to form a continuous and integral seal to the structure.

Preprufe can be returned up the inside face of slab formwork but is not recommended for conventional twin-sided formwork on walls, etc. Use Bituthene self-adhesive membrane or Procor fluid applied membrane to walls after removal of formwork for a fully bonded system to all structural surfaces.

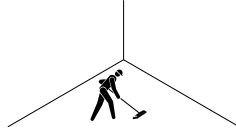


## Installation

Preprufe® 300R & 160R membranes are supplied in rolls 1.2m wide, with a selvedge on one side to provide self-adhered laps for continuity between rolls. The rolls of Preprufe membrane and Preprufe Tape are interwound with a disposable plastic release liner which must be removed before placing reinforcement and concrete.

### Substrate Preparation

**All Surfaces** - It is essential to create a sound and solid substrate to eliminate movement during the concrete pour. Substrates must be regular and smooth with no gaps or voids greater than 12 mm. Grout around all penetrations such as utility conduits, etc. for stability.



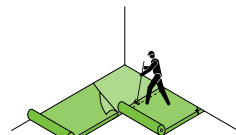
**Horizontal Blinding** - Monolithic concrete blinding or mud slab is preferred. The blinding must be free of loose aggregate and sharp protrusions. An angular profiled blinding is recommended rather than a sloping or rounded substrate. The surface does not need to be dry, but standing water must be removed.

**Vertical Sheet Piling** - Use concrete, plywood, insulation or other approved facing to sheet piling to provide support to the membrane. Board systems such as timber lagging must be close butted to provide support and not more than 12 mm out of alignment.

### Membrane Installation

Preprufe can be applied at temperatures of -4°C or above. During cold or damp conditions, the selvedge and tape adhesive can be gently warmed using a hot air gun or similar to remove moisture or condensation and improve initial adhesion.

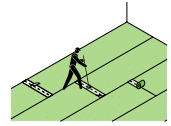
**Horizontal Substrates** - Place the membrane HDPE film side to the substrate with printed coated side up facing towards the concrete pour. End laps should be staggered to avoid a build up of layers. Leave plastic release liner in position until overlap procedure is completed. Accurately position succeeding sheets to overlap the previous sheet 75 mm along the marked selvedge. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Peel back the plastic release liner from between the overlaps as the two layers are bonded together. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller. Completely remove the plastic liner to expose the protective coating. Any initial tack will quickly disappear.



**Vertical Substrates** - Mechanically fasten the membrane vertically using fixings (i.e. fasteners) appropriate to the substrate with the printed coated side facing towards the concrete pour. The membrane may be installed in any convenient length. Secure the top of the membrane using a batten such as a termination bar or fixing 50 mm below the top edge. Fixings can be made through the selvedge so that the membrane lays flat and allows firmly rolled overlaps. Immediately remove the plastic release liner. Any additional



fixings must be covered with a patch of Preprufe Tape. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Roll firmly to ensure a watertight seal. Roll Ends and Cut Edges - Overlap all roll ends and cut edges by a minimum 75 mm and ensure the area is clean and free from contamination, wiping with a damp cloth if necessary. Allow to dry and apply Preprufe Tape LT (or HC in hot climates) centered over the lap and roll firmly. Immediately remove printed plastic release liner from the tape.

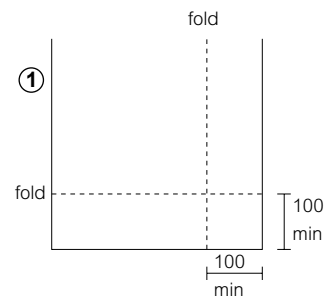


### Penetrations

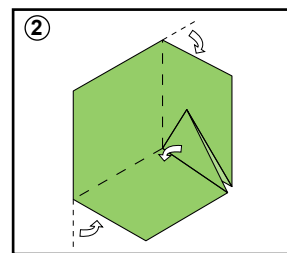
Use the following steps to seal around penetrations such as service pipes, piles, lightning conductors, etc. Grout around the penetration if the penetration is not stable. Scribe membrane tight to the penetration. If the membrane is not within 12mm of the penetration, apply Preprufe Tape to

### Corners

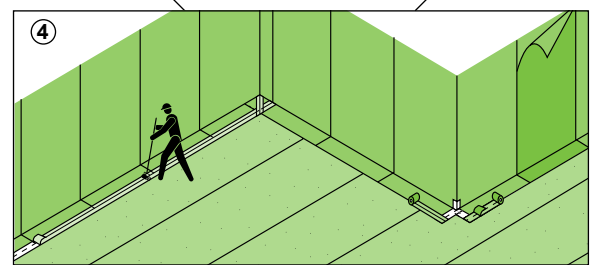
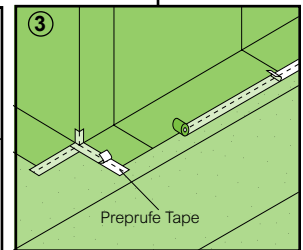
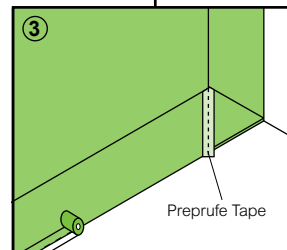
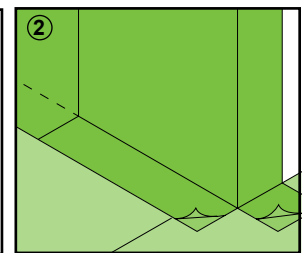
Internal and external corners should be formed as shown in the diagrams returning the membrane a minimum of 100mm and sealing with Preprufe Tape. Ensure that the apex of the corner is covered and sealed with tape and roll firmly. Crease and fold the membrane to ensure a close fit to the substrate profile and avoid hollows.



Internal



External



cover the gap. Wrap the penetration with Preprufe Tape by positioning the tape 12 mm above the membrane. Mix and apply Bituthene Liquid Membrane around the penetrations using a fillet to provide a watertight seal between the Preprufe membrane and Preprufe Tape.

### Membrane Repair

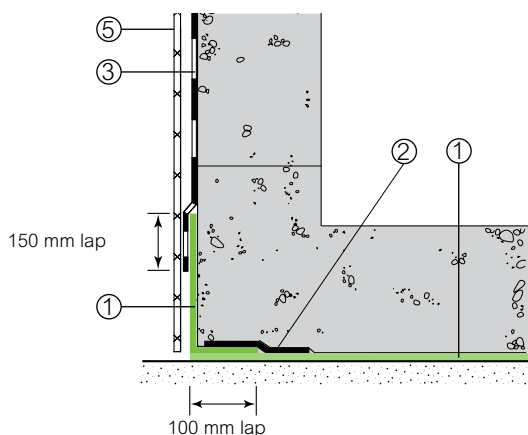
Inspect the membrane before installation of reinforcement steel, formwork and final placement of concrete. The membrane can be easily cleaned by jet washing if required. Repair damage by wiping the area with a damp cloth to ensure the area is clean and free from dust, and allow to dry. Apply Preprufe Tape centered over the damaged area and roll firmly. Any areas of damaged adhesive should be

covered with Preprufe Tape. Remove printed plastic release liner from tape. Where exposed selvedge has lost adhesion or laps have not been sealed, ensure the area is clean and dry and cover with fresh Preprufe Tape, rolling firmly. Alternatively, use a hot air gun or similar to activate adhesive and firmly roll lap to achieve continuity.

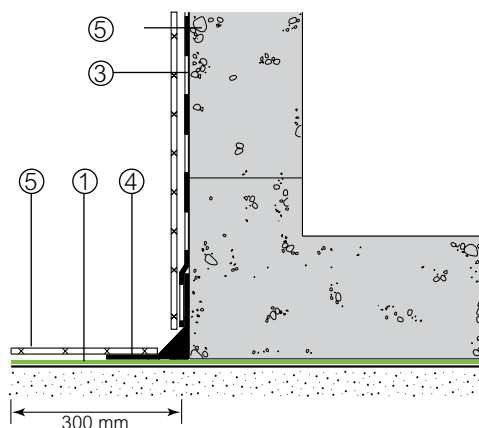
### Pouring of Concrete

Ensure the plastic release liner is removed from all areas of Preprufe R membrane and Tape. It is recommended that concrete be poured within 56 days (42 days in hot climates) of application of the membrane. Concrete must be placed and compacted carefully to avoid damage to the membrane. Never use a sharp object to consolidate the concrete.

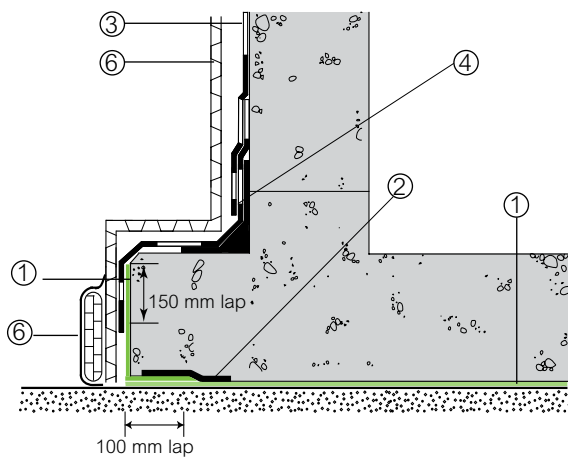
#### Wall base detail



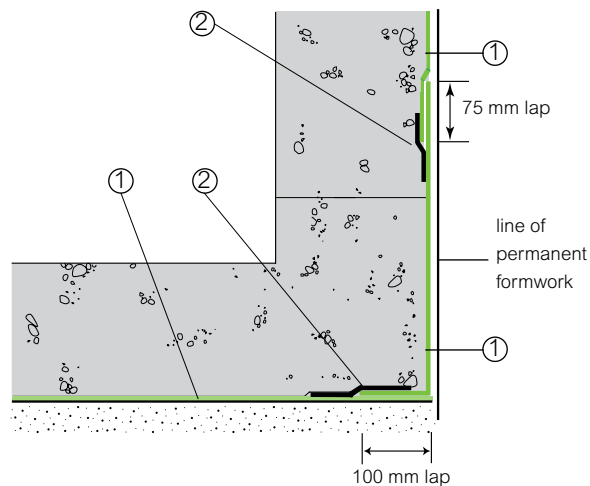
#### Alternative wall base detail for early shutter removal



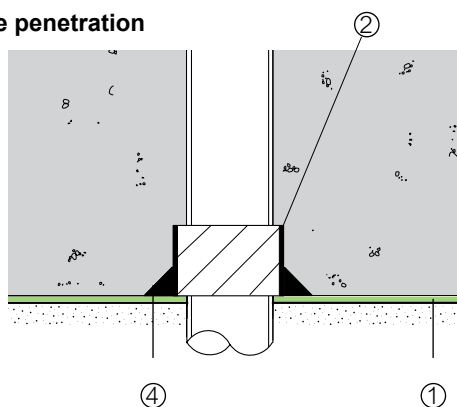
#### Wall base with toe detail showing drainage option



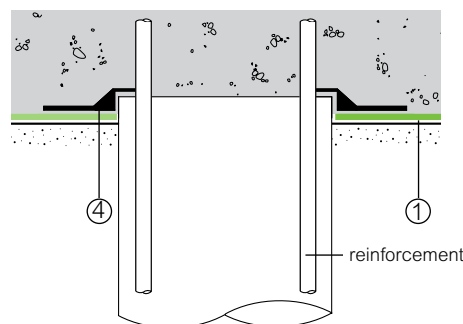
#### Wall base detail against permanent shutter



#### Pipe penetration



#### Pile detail



- |                 |                         |              |
|-----------------|-------------------------|--------------|
| 1 Preprufe      | 3 Bituthene® or Procor® | 5 Protection |
| 2 Preprufe Tape | 4 Liquid Membrane       | 6 Hydroduct® |

Details shown are typical illustrations and not working details. For assistance with detailing and problem solving please contact Grace Technical Department.

## Physical Properties

Property	Typical Value		Test Method
	300R	160R	
Colour	White		
Thickness*	1.2 mm	0.8 mm	ASTM D3767
Peel Adhesion to Concrete	880 N/m		ASTM D903 modified
Shear Strength of Joints	440 N/m		ASTM D1876 modified
Methane permeability	9.1 mls/m <sup>2</sup> /day	NA	University of London, QMW College <sup>3</sup>
Resistance to Hydrostatic Head	>70 m		ASTM D5385 modified
Low Temperature Flexibility	<-20°C		ASTM D1970
Puncture Resistance	990 N	445 N	ASTM E 154
Elongation	300% minimum		ASTM D412 modified
Tensile Strength, Film	27.6 Mpa		ASTM D412
Crack Cycling @ -23°C	Pass		ASTM C 836
Permeability	K=<1.4 x 10 <sup>-11</sup> cm.s <sup>-1</sup>		ASTM D5084-90

Typical test values represent average values from samples tested. Test methods noted may be modified.

\* Nominal thickness refers to the thickness of the membrane without release liner.

## Supply

Preprufe	300R	160R	Tape LT or HC*
Thickness (nominal)	1.2 mm	0.8 mm	-
Roll size	1.2x30.0 m	1.2x35.0 m	100 mmx15.0 m
Roll area	36.0 m <sup>2</sup>	42 m <sup>2</sup>	-
Roll weight	50 kg	42 kg	2 kg
Min. edge/end laps	75 mm	75 mm	75 mm

\* LT denotes Low Temperature (between -4°C and +30°C)  
 HC denotes Hot Climates (>+10°C)

**Ancillary Products**  
 Liquid Membrane, 5.7 litre

### Removal of Formwork

Preprufe membranes can be applied to removable formwork, such as slab perimeters, elevator and lift pits, etc. Once the concrete is poured the formwork must remain in place until the concrete has gained sufficient compressive strength to develop the surface bond. Preprufe membranes are not recommended for conventional twin-sided wall forming systems.

A minimum concrete compressive strength of 10 N/mm<sup>2</sup> (1500 psi) is recommended prior to stripping formwork supporting Preprufe membranes. Premature stripping may result in displacement of the membrane and/or spalling of the concrete.

As a guide, to reach the minimum compressive strength stated above, a structural concrete mix with an ultimate strength of 40 N/mm<sup>2</sup> (6000 psi) will typically require a cure time of approximately 6 days at an average ambient temperature of 4°C, or 2 days at 21°C.

### Specification Clauses

Preprufe 300R or 160R shall be applied with its adhesive face presented to receive fresh concrete to which it will integrally bond. Only Grace Construction Products approved membranes shall be bonded to Preprufe 300R & 160R. All Preprufe 300R & 160R system materials shall be supplied by Grace Construction Products, and applied strictly in accordance with their instructions. Specimen performance and formatted clauses are also available.

### Health and Safety

Refer to relevant Material Safety data sheet. Complete rolls should be handled by a minimum of two persons.

### Grace Technical Services

For assistance with working drawings for projects and additional technical advice, please contact Grace Technical Services.

[www.graceconstruction.com](http://www.graceconstruction.com)

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 Shanghai (86-21) 5467 4678 Singapore (65) 6265 3033 Taiwan (886-3) 461 5462  
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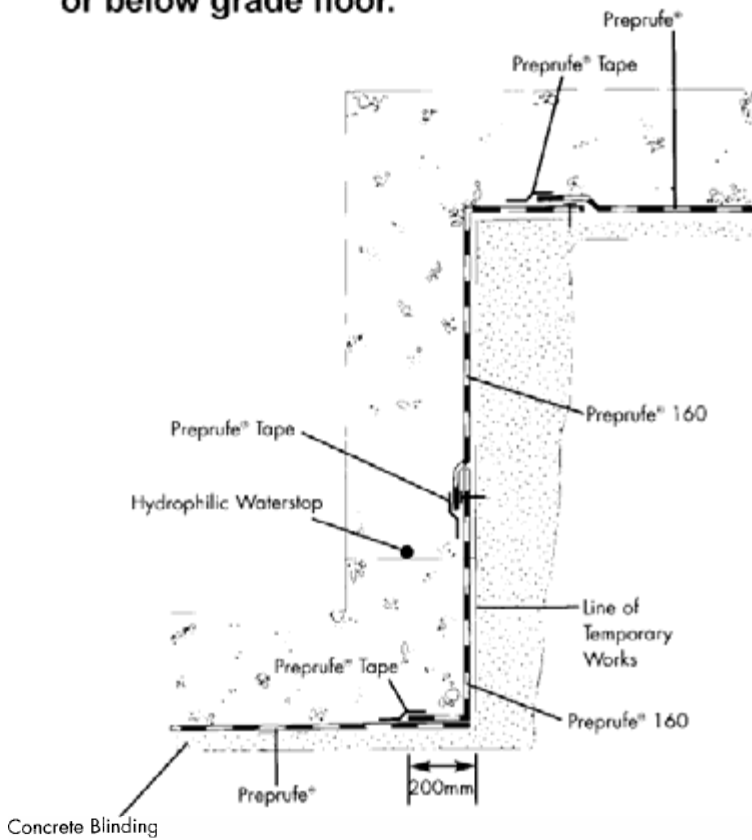
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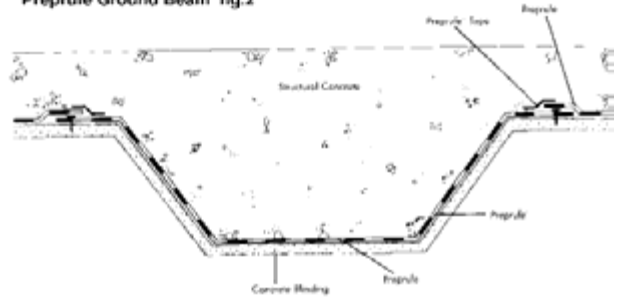
**GRACE**

## Preprufe Waterproofing Details

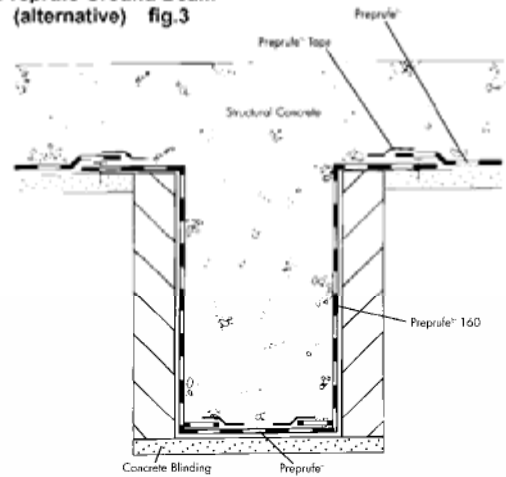
**Preprufe Lift Pit detail. fig.1  
or below grade floor.**



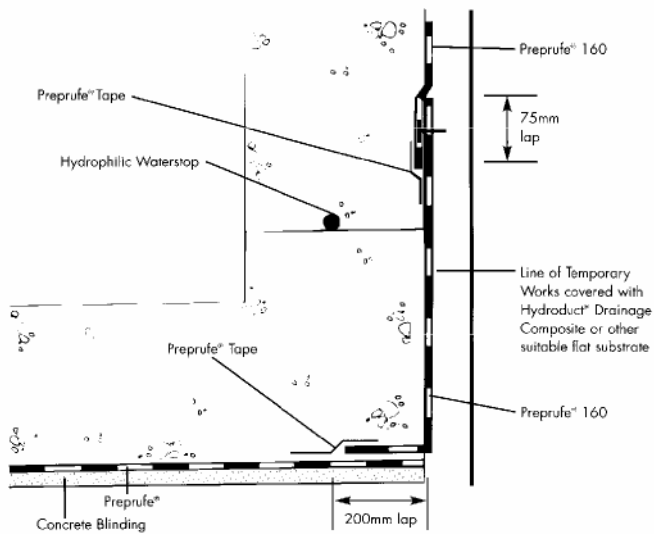
**Preprufe Ground Beam fig.2**



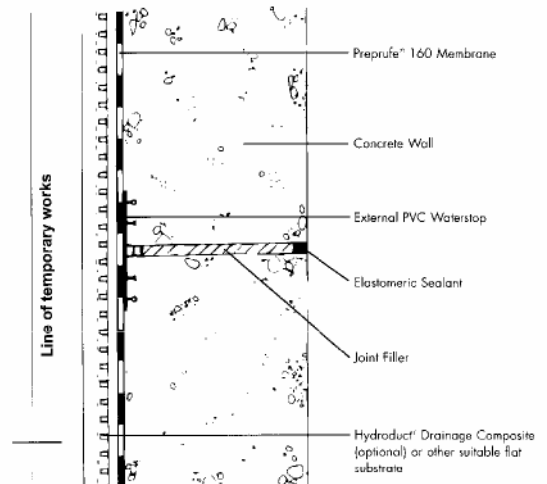
**Preprufe Ground Beam  
(alternative) fig.3**



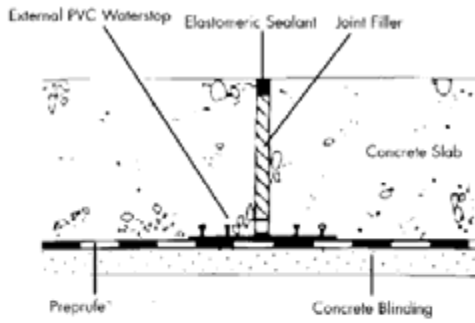
**Preprufe Wall Base Std Detail fig.4**



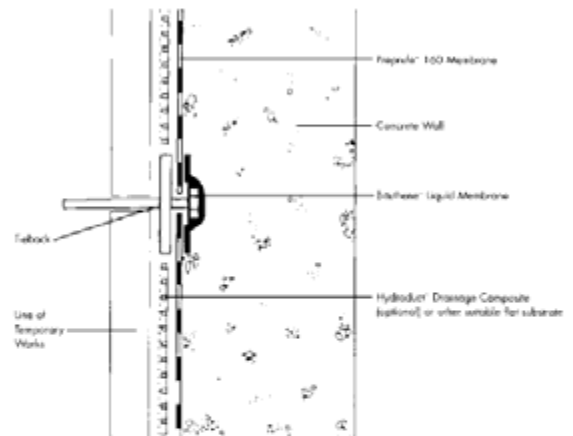
**Preprufe Wall joint (plan view) fig.5**



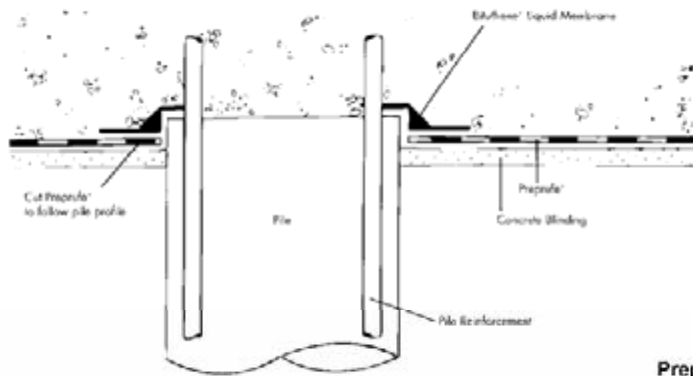
Preprufe Floor Slab Joint detail. fig.6



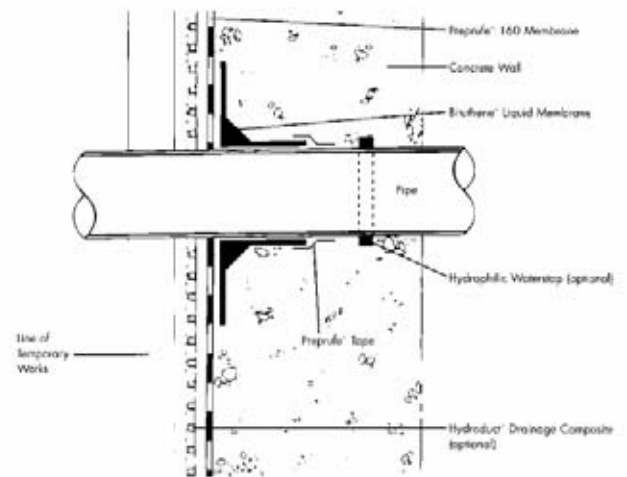
Preprufe "In wall" penetration or Tieback. fig.7



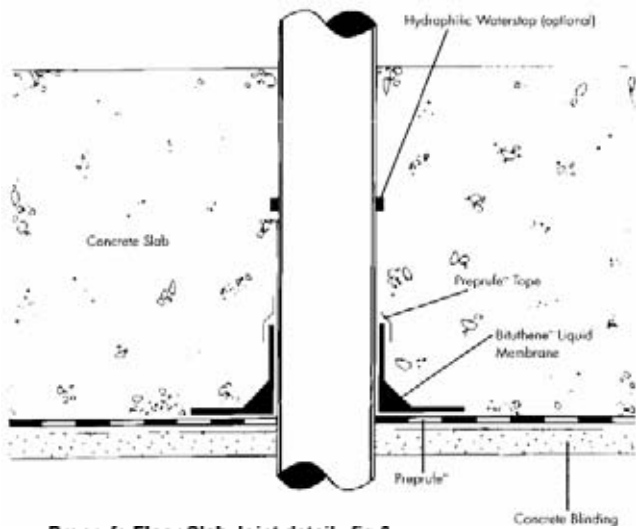
Preprufe Pile Cap detail. fig.8



Preprufe Penetration Thru Wall. fig.9



Preprufe Base Slab Pipe Penetration. fig.10

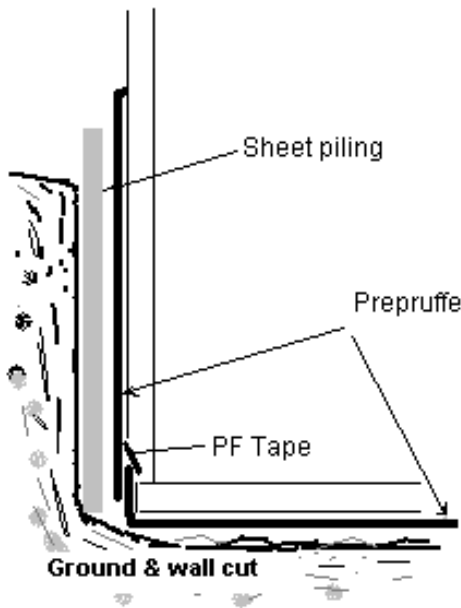


Preprufe Floor Slab Joint detail. fig.6

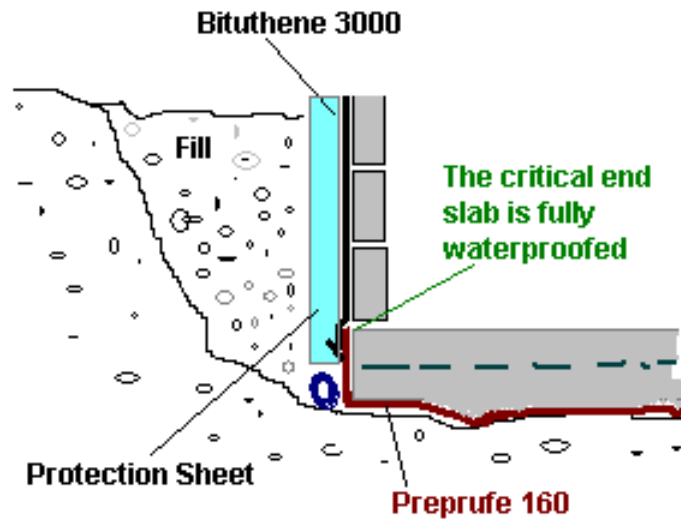
**nuplex**  
Construction Products

These diagrammatic aid in site detail recognition. See the Preprufe full details for installation.

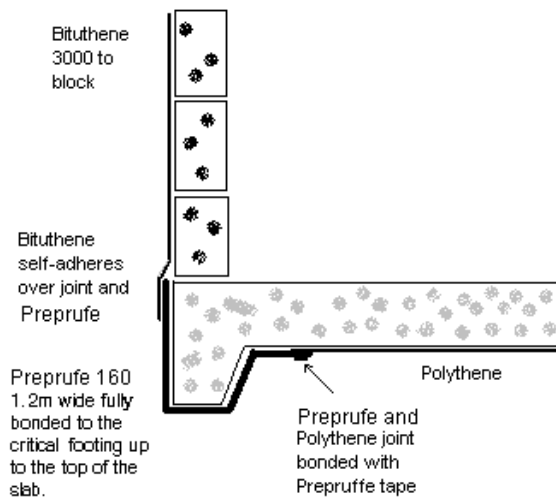
**Preprufe standard slab and wall detail. Pre-Applied waterproofing**



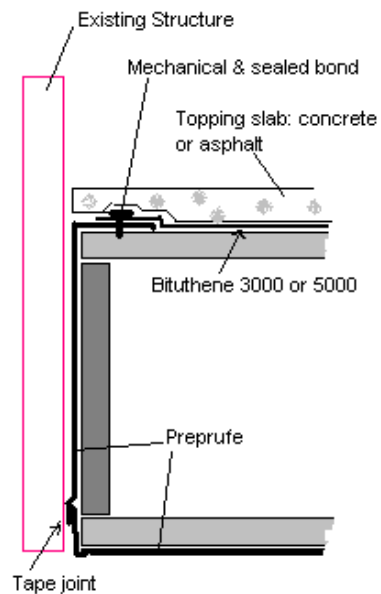
**Connecting Slab & Wall Waterproofing**



**Preprufe 160 used to fully protect a footing area**

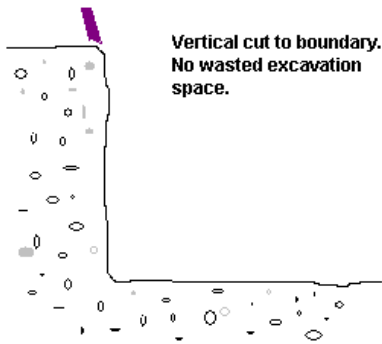


**Waterproofing near existing wall and/or forming waterproofed suspended deck**

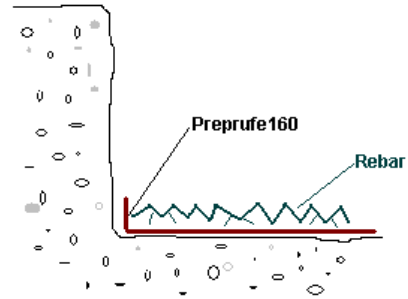


# Installation Sequence

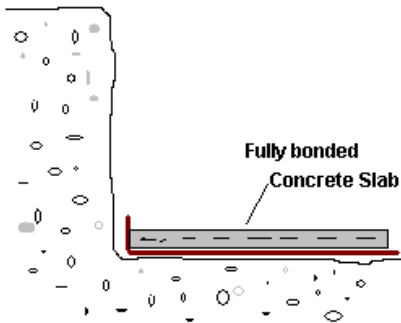
Blindside waterproofing with Preprufe 160



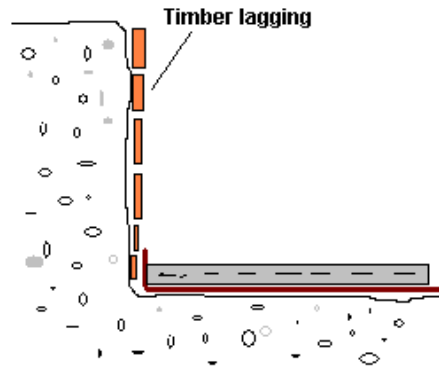
Blindside waterproofing with Preprufe 160



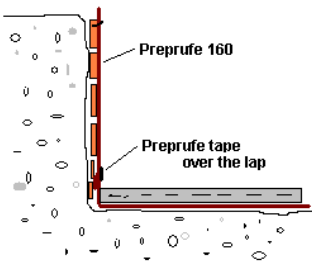
Blindside waterproofing with Preprufe 160



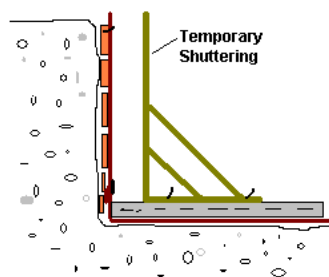
Blindside waterproofing with Preprufe 160



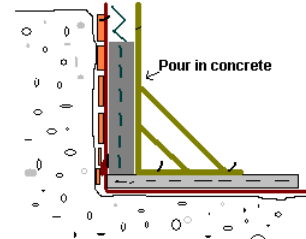
Blindside waterproofing with Preprufe 160



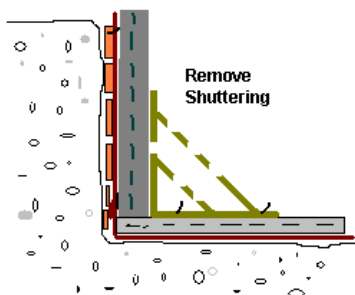
Blindside waterproofing with Preprufe 160



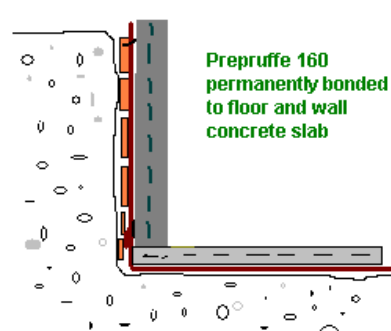
Blindside waterproofing with Preprufe 160



Blindside waterproofing with Preprufe 160



Blindside waterproofing with Preprufe 160



# Heavy Duty Water-proofing

Featuring: **Preprufe 160 & Preprufe Systems**

Features	Benefits
<b>Fully Bonded to Concrete</b>	Becomes integral with concrete floor slab or wall. Does not delaminate if fill subsides as Bentonites will do. <b>“ Preprufe seals to the structure, not the substrate”</b> (compared with Bentonite)
<b>Tough</b>	Difficult to puncture in the hard extremes of slab siteworks. Puncture resistance 445N
<b>Easy to program</b>	Fits with the building programme. Can be left exposed for 42 days. With Bentonites, the programme must fit that product due to its sensitivity to rain water.
<b>Easy to install</b>	Convenient roll form: 35m x 1.2m x 0.8mm Fully adhered watertight laps
<b>Tough Bond</b>	Will not allow water migration between sheet and concrete interface. Cuts do occur in “real” sites. Preprufe 160 controls that water. Bentonites do not.
<b>Compatible</b>	Easy to join with / to other water proofing systems eg Bituthene 3000, LM3000 liquid membrane.
<b>Detailed</b>	Easy and quick to detail on site around columns, pile caps, penetrations etc
<b>Resistant</b>	Zero moisture vapour transmission. Gas impermeable – isolates the structure from the ground.
<b>Cost Efficient</b>	Can build to the boundary. Preprufe is a pre-applied waterproofing applied to the cut face. (or under Slab)
<b>Flexible</b>	Elongation 300% min
<b>Multipurpose</b>	Used in commercial or residential applications. Although recommended under the slab, it can tie to polythene.(see detail over)
<b>Warranty</b>	Extensive warranty from two large multinational companies: Nuplex Industries and Grace Construction products. Compliant with E2/AS1 50 year durability requirements.