

# Preprufe<sup>®</sup> SCS

Blindside waterproofing system for shotcrete foundation walls

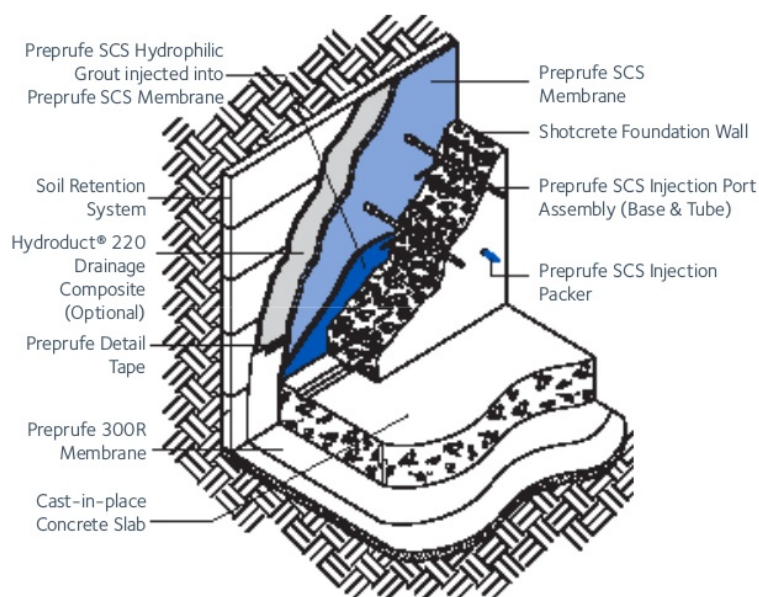
## Product Description

Preprufe<sup>®</sup>SCS is a unique blindside waterproofing system specifically developed to provide a high performance waterproofing solution for shotcrete foundation walls. The waterproofing system consists of the following:

- Preprufe SCS Membrane consisting of a polymer mesh-reinforced cavity backed by a plastic film facing the soil retention system, and faced with a non-woven, semi-permeable geotextile acting as a shotcrete barrier while allowing grout to bond to the shotcrete.
- Preprufe SCS Grout Injection Ports installed prior to shotcrete placement to facilitate hydrophilic grout injection.
- Preprufe SCS Hydrophilic Grout post-injected under pressure into composite sheet through injection ports left protruding through the shotcrete. The shotcrete side of the membrane enables grout to bond with shotcrete across the permeable geotextile.

The Preprufe SCS Composite Sheet Membrane is applied vertically to timber lagging or other soil retention systems. Shotcrete is then placed directly against the geotextile side of the membrane. Unlike conventional waterproofing systems, Preprufe SCS waterproofing system has injection ports to facilitate grout injection into a pre-created cavity space, forming an in-situ monolithic grout membrane with uniform thickness. After shotcrete placement, injection of the specially formulated Preprufe

SCS Hydrophilic Grout fills and seals the system, thus providing ultimate waterproofing protection. All components of the specially developed Preprufe SCS System work together to form a continuous and integral bond to the structure, eliminating lateral water migration between the membrane and the shotcrete. When properly installed and grouted, the Preprufe SCS System will protect against water ingress.



## Product Advantages

- Durable system designed specifically to withstand the force of shotcrete placement
- Post-injected grout fills and seals, providing ultimate waterproofing protection
- Aggressive bond to shotcrete resists lateral water migration
- Excellent resistance to hydrostatic pressure

## Installation

The Preprufe SCS System is intended to be installed by trained applicators only. For a list of trained applicators, please contact your GCP representative. All Preprufe SCS System materials shall be supplied by GCP Applied Technologies, and applied strictly in accordance with their instructions. Refer to the Preprufe SCS waterproofing systems installation manual for detailed application instructions.

### Substrate Preparation

It is essential to create a sound and solid substrate to eliminate movement during the shotcrete placement. Substrates must be regular and smooth with no gaps or voids greater than 1/2 in. (12mm). Grout around all penetrations such as utility conduits, etc. for stability.

If necessary, apply plywood, rigid insulation, Hydroduct®220 drainage composite or other approved facing to substrate to provide support to the membrane. Board systems such as timber lagging must be close butted to provide support and not more than 1/2 in. (12mm) out of alignment. For areas close to finished grade where steel soldier piles and wood lagging will be removed, install a protection layer of 1/2 in. (12mm) thick cementitious wall board centred over the steel soldier piles.

Apply Preprufe 300R membrane below all horizontal slabs and rafts (i.e. mud slabs) extending a minimum of 18 in. (457mm) beyond the top of slab and protect from over splash. Refer to the Preprufe 300R membrane product Information for more detailed installation instructions. If Preprufe 300R membrane will not be used below the slab, consult your local GCP representative.

### Membrane Installation

The Preprufe SCS Membrane can be applied at temperatures of 40°F (4°C) or above. The membrane may be installed in any convenient length but is best installed vertically the full length of the soil retention system leaving an additional 12 in. (305mm) of membrane at the top to tie into the horizontal waterproofing when necessary. With the geotextile side facing towards the shotcrete placement, attach the membrane to the substrate with staples approved by GCP spaced at 24 to 36 in. (610 to 914mm) down the middle of the membrane. Ensure the plastic film extension and the underside of the succeeding sheet are clean, dry and free from contamination before attempting to overlap. Apply the Preprufe Detail Tape at the centre of the film extension. Overlap the seams 2 1/2 in. (64 mm) minimum with membrane and ensure the top piece of membrane has only the geotextile extension (not plastic film) on the top of the existing membrane. Remove the release liner from the Preprufe Detail Tape and roll the membrane firmly at the seam with a hand roller to ensure a good seal. Mechanically fasten the seam on the geotextile overlap with staples spaced at 12 to 18 in. (305 to 457mm).

**Roll ends and cut edges**—Place Preprufe CJ Tape under the membrane with adhesive side facing membrane, centred along ends/cut edges. Secure strip to the substrate by staples. Ensure the underside of membrane is clean, dry and free from contamination. Butt joint membrane and roll firmly at the seam with a hand roller to ensure a good seal. Apply Preprufe SCS Geotextile Strip centred over the butt joint and secure on the top and bottom of butt joint with staples at 12 to 18 in. (305 to 457mm) oc.

## Penetrations

For Service Pipes, Rebar, All-Thread, Metal Dowels, etc. — follow these steps to seal around penetrations:

- Clean loose dust or dirt from the penetration and the surrounding substrate surface using a clean, dry cloth or brush. Remove rust, if applicable, with a wire brush and wipe clean.
- Cut the Preprufe SCS Membrane tight to within 1/2 in. (12mm) of the penetration. If the membrane is 1 in. (25mm) or more from the penetration, install a cut-to-fit “filler strip” of the membrane to cover the gap following the membrane repair guidelines until the membrane is within 1/2 in. (12mm) of the penetration.
- Apply Preprufe Hydrophilic Sealant to cover the gap and form a minimum 1/4 in. 6mm but no more than 1 in. (25mm) thick continuous fillet between the plastic film side of the membrane and the base of the penetration. Extend a 90 mil (2.2mm) continuous coating of sealant onto the surface of the membrane overlapping a minimum of 1 in. (25mm).

## Tiebacks

Prior to membrane installation, fasten Preprufe Tieback Cover ABS base to the substrate to cover the tieback. Apply the Preprufe Detail Tape around the outside edge of the ABS base. Install the Preprufe SCS Membrane over the ABS base and then cut out the membrane 1/2 in. to 1 in. (12mm to 25mm) around the dome hemisphere. Remove the release paper on the Preprufe Detail Tape and press the membrane firmly to the ABS base. Roll the membrane firmly at the joint with a hand roller to ensure a good seal. Position Preprufe Tieback Cover on top of the ABS base and mechanically fasten the Preprufe dome. Apply Preprufe Tape (LT or HC) over the top edge of the tieback cover.

## Terminations

Position Preprufe CJ Tape under the membrane along the termination, centred along the membrane cut edges/roll ends. Secure half of the tape under the membrane to the substrate with staples. Press the membrane firmly onto the tape and fold over the membrane. Roll the folding area with a hand roller to ensure a good seal. Remove the release paper. Mechanically fasten by staples at 12 in. (305mm) oc along the top edge of the CJ tape.

## Injection Port Layout

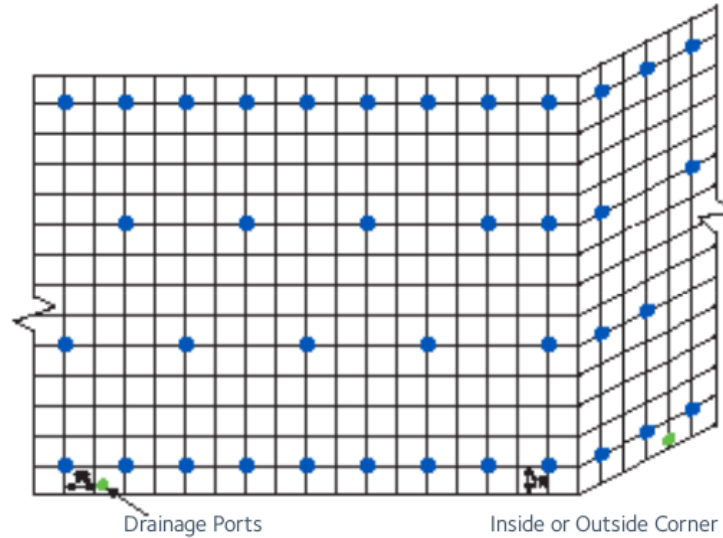


Figure 1

### Tie-ins of Preprufe SCS Membrane to Preprufe 300R Sub Slab Waterproofing

Install Preprufe 300R membrane over the prepared substrate as detailed in Preprufe 300R membrane installation guide. If Preprufe 300R membrane will not be used below the slab, consult your local GCP representative.

Apply a continuous length of the Preprufe Detail Tape to the top edge of the Preprufe 300R membrane. Remove the release liner. Apply a horizontal strip of the Preprufe SCS Membrane over the Preprufe 300R membrane with the plastic film extension facing up and the bottom of the membrane resting on the poured concrete slab. Press the Preprufe SCS Membrane to the tape and roll firmly with a hand roller. Preprufe SCS Membrane installation continues vertically up the wall as outlined above. If necessary, apply 4 in. (102mm) pieces of Preprufe Detail Tape at 4 ft (1219mm) oc to the bottom edge of the Preprufe SCS Membrane to secure to the Preprufe 300R membrane.

Do not use mechanical fasteners through the Preprufe 300R membrane.

### Membrane Repair

Inspect the membrane before and after installation of reinforcement steel.

Repair damage by wiping the area with a damp cloth to ensure the area is clean and free from dust and allow to dry. Repair small punctures 1/2 in. (12mm) or less and slices by applying Preprufe Hydrophilic Sealant centred over the damaged area. Repair large holes and punctures by first cutting out the damaged area. Next, prepare a length of Preprufe CJ Tape at least 3 in. (76mm) wider than the damaged area on each side. Overlap the Preprufe CJ Tape with 3 in. (76mm) overlap to make a large piece if necessary. Centre the Preprufe CJ Tape under the damaged area with adhesive side facing the membrane. Secure the tape with staples. Ensure the membrane overlaps at least 3 in. (76mm) on the tape on each side. Apply a patch of membrane with plastic film removed and geotextile side facing shotcrete extended 6 in. (150mm) beyond the damaged area. Secure the patch with staples at 4 in. (100mm) oc on each side.

## Injection Port Installation

Install injection port assembly after installation of reinforcement steel and before shotcrete placement.

Pre-assemble injection port assembly by cutting a piece of Preprufe SCS injection tube, 4 in. (100mm) longer than the thickness of the wall and twisting the tube into a Preprufe SCS Injection Base until a tight connection is made.

The injection port assembly spacing shall be 4 feet in any direction with 2 feet offset every vertical step. The top and bottom layer of injection port assemblies shall be two feet in spacing, located one foot from the edge of the membrane. All vertical corners and terminations shall have port assemblies spaced 4 feet vertically, located one foot from the corner or termination. To allow existing water to drain from the system prior to grout injection, install additional port assemblies 1 in. (25mm) above the bottom of the membrane at 20 feet (6.1m) oc (refer to Figure 1). All tie-back covers shall have one injection port assembly installed, located on the membrane directly above the tieback (not shown in the Figure). Set all injection port assemblies in a consistent location at reinforcing steel intersections (above to the right, above to the left, etc.) to be able to predict the drill area if required.

Position the injection port assembly adjacent to the intersection of the reinforcing steel. Press injection port assembly tightly against

the membrane, and screw the injection base into the membrane by turning the nozzle clockwise. The port assembly should be twisted until it cannot turn any further (usually 1/4 to 1/2 rotation, although more may be needed). If the port assembly does not snag the geotextile or stop rotating, it has not been attached to the membrane properly. Repeat with a new injection base. Tie the tubing to both the inside and outside layer of reinforcing steel with rebar ties. Cover the tubing end with duct tape to prevent blockage during the shotcrete placement.

## Shotcrete Placement

Inspect the port installation before the placement of shotcrete to ensure all ports are still attached to the membrane. Reinstall any damaged or loose ports.

It is recommended that shotcrete be placed within 56 days (42 days in hot climates) of the membrane installation. Shotcrete must be placed in accordance with ACI 506.2. Never use a sharp object to consolidate the concrete. Avoid putting large force on injection tubing during shotcrete surface finishing. Shotcrete surface finish around all injection ports should be the same as the rest of the wall, avoiding any rough areas or projections adjacent to the ports.

## Grouting Procedure

### Safety

Preprufe SCS Hydrophilic Grout products must be handled properly. Refer to product label and Material Safety Data Sheet before use. All users should acquaint themselves with this information prior to working with the material. Users must be aware that the equipment used for the Preprufe SCS Waterproofing System operates under pressure. Only trained individuals should operate this equipment. Installation personnel should utilize all necessary personal protective gear.

## General Guidelines

Preprufe SCS Hydrophilic Grout can be injected into the Preprufe SCS membrane a minimum of seven days to a maximum of 6 months after the shotcrete placement. This minimum wait period allows the shotcrete to gain sufficient compressive strength. A minimum concrete compressive strength of 1500 psi (10N /mm<sup>2</sup>) is recommended prior to grout injection.

## Port Preparation

Cut the tubing flush to the shotcrete surface and install the Preprufe SCS Injection Packer into the tubing. Allow all water to gravity drain from the bottom “drainage ports” prior to installing the packer. Tighten packers using a ratchet, electric drill fitted with a socket, or open-end wrench by turning clockwise until firm and secure. Packers are supplied with a one-way check valve to minimise back flow during the injection procedure. If the installed injection ports are not provided at intervals that will ensure full depth penetration as specified, drill additional holes through the shotcrete but not the membrane. Press grouting packers fitted with sleeves into the drilled holes until secure.

## Grout Injection

The pump mix manifold and clutch that will be used for injecting the Preprufe SCS Hydrophilic Grout should be flushed with flushing agent prior to beginning the grout operation. By flushing you lubricate the system. After injecting, the pump mix manifold and clutch should be flushed to remove any liquid grout residue.

The general injection technique is as follows:

- Measure the materials temperature and refer to chart in the detailed installation manual for usage of Activators A and B to get 60 to 90 seconds setting time. All results are based on laboratory tests. Site trials should always be carried out to determine the actual setting time.
- Determine the pumping volume per port as outlined in the detailed installation manual.
- Being injection from bottom to top. Start injection from one end to the other end or any convenient distance at each horizontal level, then switch to the next level and follow the same sequence. If injection port assembly is not functioning well and grout refusal has been seen, be sure to drill an injection hole using the drilling procedure provided and inject the grout before moving to the next level.
- If the pump site idle (no grout being injected) for more than 30 seconds, flush the pump mix manifold and clutch with flushing agent.

If excessive pumping pressures are needed to cause grout flow or manifold pressure changes significantly, discontinue injection, flush the pump mix manifold and clutch, and notify your local GCP representative immediately. Avoid sudden application of high pressures during the injection process. Grouting pressure before the mixing head shall not exceed 500psi. After the grout cures, the packers can be removed and the ports cut off flush with the concrete surface. If a finished surface is required, drill the first 2 in. (51mm) of the ports using a 5/8 in. diameter drill bit and patch with Preprufe SCS Port Patch.

## Supply of Components

PRODUCT NAME	DESCRIPTION	SUPPLY
<b>Membrane Installation</b>		
Preprufe SCS Membrane	A unique composite sheet membrane applied vertically to the soil retention system serving as a channel to contain the flow of the post-injected grout.	Rolls, 40 in. (1m) x 100 ft, with a lap extension on both sides to provide continuous membrane between rolls
Preprufe Detail Tape	A two-sided, highly aggressive adhesive tape for sealing side laps and other miscellaneous details.	Rolls, 2 in. x 50 ft, 18 rolls per box
Preprufe SCS Geotextile Strip	A semi-permeable geotextile for covering cut edges and roll ends.	Rolls, 12 in. x 1,000 ft, 1 roll per box
Preprufe CJ Tape (LT or HC)*	A reinforced, pressure-sensitive tape for sealing cut edges, roll ends, and terminations.	Rolls, 8 in. x 49 ft, 4 rolls per box
Preprufe Hydrophilic Sealant	A caulk-applied hydro-swelling mastic for sealing around pipe penetrations, rebar, utility conduits, etc.	10.5 oz cartridges, 12 per box
Preprufe 300R	A composite sheet membrane for transitions to other waterproofing systems (top, bottom, sides).	Refer to Preprufe 300R data sheet
<b>Injection Port Assembly Installation</b>		
Preprufe SCS Injection Base	A specially designed component used to mechanically attach the injection tube to the membrane.	1,000 bases per box
Preprufe SCS Injection Tube	A durable, flexible tube used to deliver the grout to the membrane after shotcrete placement.	100 lf coils, 5 coils per box
<b>Grout Injection</b>		
Preprufe SCS Injection Packer	Button-head, backflow prevention packer used to connect the grout pump to the injection tube.	500 packers per box
Preprufe SCS Hydrophilic Grout Part A	Grout part A for injection into Preprufe SCS Membrane providing ultimate waterproofing protection.	5 gallon pails
Preprufe SCS Hydrophilic Grout Part A Activator	Activator used for Part A to provide for temperature flexibility during installation.	28fl oz cans
Preprufe SCS Hydrophilic Grout Part B	Grout part B for injection into Preprufe SCS Membrane providing ultimate waterproofing protection.	50 gallon drums or 5 gallon pails
Preprufe SCS Hydrophilic Grout Part B Activator**	Activator used for Part B to provide for temperature flexibility during installation.	2lb jars
<b>Ancillary Products (if required)</b>		

Preprufe Tieback Cover	A specially designed, two-part cover used to maintain waterproofing integrity at soil retention tieback heads.	Refer to Preprufe Tieback Cover data sheet
Preprufe Tape (LT or HC)*	A reinforced, pressure-sensitive tape for sealing Preprufe Tieback Cover.	Rolls, 4 in. x 49 ft, 4 rolls per box
Hydroduct 220 Drainage Composite	A prefabricated geocomposite drain for use as a combined drainage and protection layer.	Refer to Hydroduct 220 data sheet

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

\*\* Part B Activator is shipped as hazmat: corrosive

## Environmental Conditions

### Precautions

Prior to application, a local GCP representative should be consulted to verify that site conditions are appropriate for the Preprufe SCS System.

The Preprufe SCS System includes injection of grout at high pressures. The Project Structural Engineer should evaluate the site for potential affects on adjacent building elements. Injection has the potential to cause hidden damage if installed incorrectly.

### Limitations

Low temperatures will significantly elongate set times. Bring product up to a minimum temperature of 50°F for a minimum period of 24 hours prior to use. If site temperatures are extremely low, material should be held in a warm area before and during use to maintain the product’s temperature. Allow no water into open containers. DO NOT EXCEED 90°F WHEN WARMING. (CAUTION - pH NOTICE. Water used on site to activate grouts must be in a range of pH 5.5 to 7 for optimum grout quality. Varying water pH will cause the reaction times to change. Test ground water for pH and consult with the manufacturer to ensure the pH falls within the threshold limitations.)

## Storage and Handling

All Preprufe SCS waterproofing system grout components should be shipped and stored in a dry place at temperatures between 40°F and 90°F. Do not thin with solvents. Warning! Do not let Part A Activator and Part B Activator come into contact with each other prior to field mixing. A very exothermic reaction generating noxious gases may result. STORE COMPONENTS SEPARATELY FROM EACH OTHER.

## Physical Properties

PROPERTY	TYPICAL VALUE	TEST METHOD
Thickness	0.17 in.	ASTM D6525
Elongation at Ultimate Break	200%	ASTM E154
Tensile Strength	400psi	ASTM E154



Peel Adhesion to Concrete	5 pli	ASTM D903
Resistance to Hydrostatic Head	60m	ASTM D53851
Puncture Resistance	890N	ASTM E154
Impact Resistance, Membrane	No Change in Appearance	SAE J4002

## Footnotes:

1 Hydrostatic head tests are performed by casting concrete against the geotextile side of membrane with a lap then injecting grout into membrane space. The cured block is cracked and then placed in a chamber where water is introduced to the membrane surface including the lap up to 231 ft (70m) head.

2 The tests are performed by projecting 3/8 in. gravel by means of 100psi air blast onto geotextile side of membrane.

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