PREPRUFE® SCS Plus Data Sheet

Blindside waterproofing system for shotcrete foundation walls

PREPRUFE® SCS Installation Video

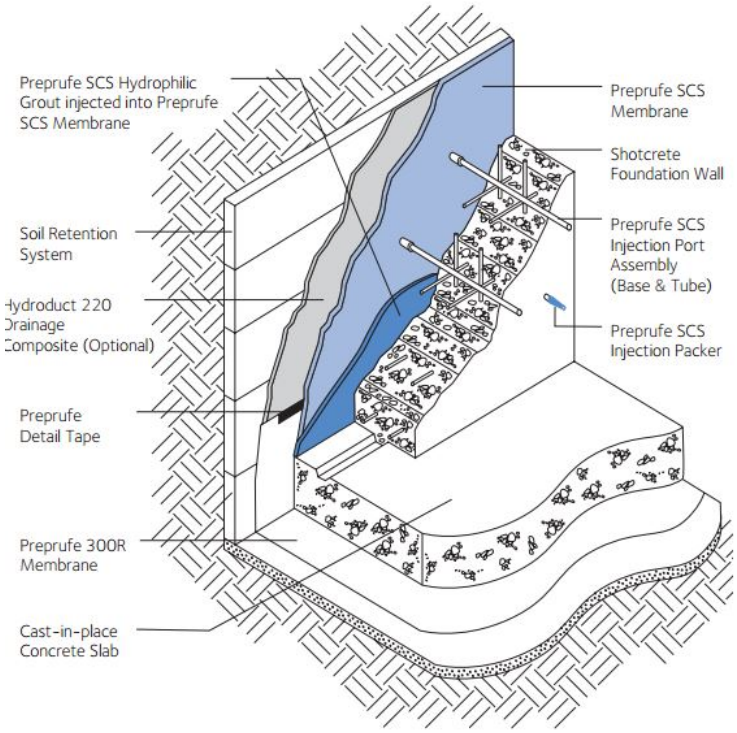
Product Description

PREPRUFE® SCS Plus 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 Plus 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 Plus membrane is a methane barrier fully complaint to LARR requirement of LADBS AC-L137 for waterproofing and 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 Plus 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, the 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 is used to fill and seal the system, 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

GCP'S PREPRUFE®SCS is the only waterproofing solution specifically designed to solve the challenges associated with shotcrete waterproofing

- Durable system designed specifically to withstand the force of shotcrete placement
- Methane barrier and waterproofing complying to LARR requirement
- Post-injected grout creates a seamless, monolithic curtain of grout that permanently and fully adheres to Shotcrete walls and fills void, cracks and rebar shadows within the shotcrete wall to stop lateral water migration
- PREPRUFE SCS Grout quickly gels, sealing around rebar anchors and penetrations for added redundancy
  - In the event of water intrusion past the membrane, PREPRUFE®SCS Grout hydrophilic properties cause it to expand and block the water from entering the building.
- Proven track record of successful Shotcrete wall waterproofing

Installation

The PREPRUFE® SCS system is intended to be installed by GCP trained applicators only. For a list of trained applicators, please contact your GCP representative. All PREPRUFE® SCS system materials shall be supplied by GCP and applied strictly in accordance with the company's 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. (12 mm). Grout around all penetrations such as utility conduits for stability.

If necessary, apply plywood, rigid insulation, HYDRODUCT® 220 drainage composite or other approved facing to the 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. (12 mm) 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. (12 mm) thick cementitious wall board centered over the steel soldier piles. Apply the PREPRUFE® 300R membrane below all horizontal slabs and rafts (i.e., mud slabs), extending a minimum of 18 in. (457 mm) beyond the top of the slab and protect from over splash. Refer to the PREPRUFE® 300R membrane product information for more detailed installation instructions. If the PREPRUFE® 300R membrane will not be used below the slab, consult your GCP representative.

Membrane Installation

The PREPRUFE® SCS Plus membrane can be applied at temperatures of 25°F (-4°C) or above. The waterproofing membrane may be installed in any convenient length, but is best installed vertically along the full length of the soil retention. With the geotextile side facing toward the shotcrete placement, attach the membrane to the substrate with staples, approved by GCP, spaced at 24 to 36 in. (610 to 914 mm) O.C. 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. Overlap the seams by following self-adhesive selvedge guideline to provide a minimum of 4 in. (100 mm) overlap and ensure the top piece of SCS Plus membrane has only the geotextile extension (not film) on the top of the existing SCS Plus membrane. Remove the release liner from the PREPRUFE®SCS Plus membrane and roll the membrane firmly at the seam with a hand roller to ensure a good seal. Mechanically fasten the overlap with staples spaced at 12 to 18 in. (305 to 457mm) O.C.

For roll ends and cut edges, place PREPRUFE® CJ Tape under the membrane with the adhesive side facing membrane centered along the ends/cut edges. Secure strips to the substrate with staples. Ensure the underside of the membrane is clean, dry and free from contamination. Butt joints the membrane and roll firmly at the seam with a hand roller to ensure a good seal. Apply PREPRUFE®SCS geotextile strip centered over the butt joint and secure on the top and bottom of the butt joint with staples at 12 to 18 in. (305 to 457 mm) O.C.

Penetrations

Follow steps as per Preprufe SCS waterproofing system standard detail # SCS – 004A/B to seal around penetrations such as service pipes, rebar, all-thread and metal dowels. Overlap Preprufe SCS Plus membrane with two lines of Preprufe Detail Tape over the Preprufe target sheets. For technical assistance, please contact GCP Technical Services or your local GCP representative.

Tiebacks

Prior to membrane installation, fasten the PREPRUFE® Tieback Cover ABS base to the substrate to cover the tieback. Apply PREPRUFE® Detail Tape around the outside edge of the ABS base. Install the PREPRUFE® SCS Plus membrane over the ABS base and then cut out the membrane 1/2 in. to 1 in. (12 mm to 25 mm) around the dome hemisphere.

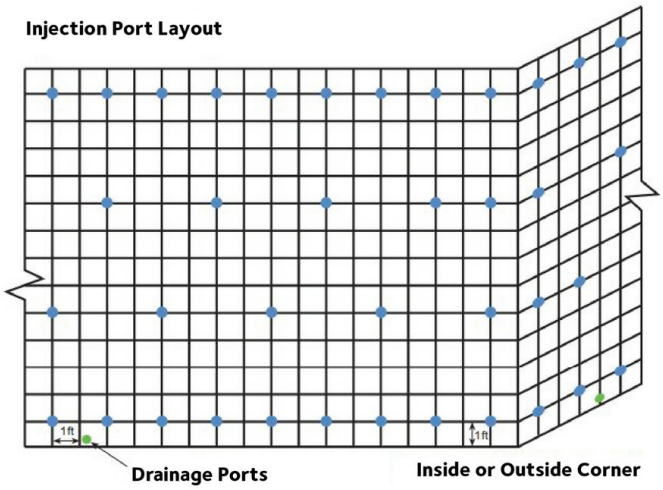
Remove the release paper on the PREPRUFE® Detail Tape and press the membrane firmly to the ABS base. Roll the membrane firmly at the joint with a hand roller to ensure a good seal. Position the PREPRUFE® Tieback Cover on top of the ABS base and mechanically fasten the PREPRUFE® dome. Apply PREPRUFE® Detail Tape (LT or HC) over the top edge of the tieback cover.

Terminations

Position PREPRUFE® CJ Tape under the SCS Plus membrane along the termination, centered 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 with staples at 12 in. (305 mm) O.C. along the top edge of the PREPRUFE® CJ Tape.

Tie-ins of PREPRUFE® SCS Plus Membrane to PREPRUFE® 300R Sub-slab Waterproofing

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



PREPRUFE® SCS Figure 1

Apply two parallel lengths of PREPRUFE® Detail Tape, one at the top edge of the PREPRUFE® 300R Plus membrane and the other 6-12 in. (150-300 mm) from the top of slab. Remove the release liner. Press the PREPRUFE® SCS Plus membrane to the tape and roll firmly with a hand roller. If necessary, apply 4 in. (102 mm) pieces of PREPRUFE® Detail Tape at 4 ft (1.2 m) O.C. to the bottom edge of the PREPRUFE® SCS Plus membrane to secure it to the PREPRUFE® 300R Plus membrane. Do not use mechanical fasteners through the PREPRUFE® 300R Plus membrane.

Membrane Repair

Inspect the SCS Plus 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./12 mm or less) and slices by applying SWELLSEAL®WA centered 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. (76 mm) wider than the damaged area on each side. If necessary, overlap the PREPRUFE® CJ Tape with a 3 in. (76 mm) overlap to make a large piece. Center the PREPRUFE® CJ Tape under the damaged area with the adhesive side facing the membrane. Secure the tape with staples. Ensure the membrane overlaps at least 3 in. (76 mm) on the tape on each side. Apply a patch of SCS Plus membrane with the film removed and the geotextile side facing shotcrete extended 6 in. (150 mm) beyond the damaged area. Secure the patch with staples at 4 in. (100 mm) O.C. on each side.

Injection Port Installation

Install the injection port assembly after installation of reinforcement steel and before shotcrete placement. Pre-assemble the injection port assembly by cutting a piece of PREPRUFE® SCS injection tube 4 in. (100 mm) 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 2 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. (25 mm) above the bottom of the membrane at 20 feet (6.1 m) O.C. (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).

Position the injection port assembly adjacent to the intersection of the reinforcing steel. Press the injection port assembly tightly against the SCS Plus 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 - 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 SCS Plus membrane. Reinstall any damaged or loose ports.

It is recommended that shotcrete be placed within 56 days (42 days in hot climates) of the SCS Plus 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 the 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

Read the product label and Preprufe SCS Grout safety data sheet (SDS) and for each system component. All users should acquaint themselves with this information prior to working with the products and follow the precautionary statements. SDSs can be obtained by contacting your local GCP representative or office, by calling GCP toll free at 1-866-333-3SBM (3726) and in some cases from our website at gcpat.com.

Users must be made 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 Plus membrane a minimum of seven days to a maximum of six months after the shotcrete placement. This minimum wait period allows the shotcrete to gain sufficient compressive strength. A minimum concrete compressive strength of 1,500 psi (10 N/mm^2) is recommended prior to grout injection.

Preprufe SCS Grout is 'one to one (1:1)' ratio product. To complete one kit of Grout set; below 4 SKUs must be needed.

- 1 pail of Preprufe® SCS Hydrophillic Grout Part A
- 1 pail of Preprufe® SCS Hydrophillic Grout Part B
- 1 can of Preprufe® SCS Hydrophillic Part A Act
- 1 jar of Preprufe SCS Hydrophilic Part B-Act 2lb

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 or open-end wrench, by turning clockwise until firm and secure. Packers are supplied with a one-way check valve to minimize back flow during the injection procedure.

Grout Injection

The pump mix manifold and clutch that will be used for injecting PREPRUFE® SCS hydrophilic grout should be flushed with flushing agent prior to beginning the grout operation. Flushing lubricates 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 material's temperature and refer to the chart in the detailed installation manual for usage of Activators A and B to get 60–90 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.
- Begin 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 the pump sits 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 GCP representative immediately. Avoid sudden application of high pressures during the injection process. Grouting pressure before the mixing head shall not exceed 500 psi.

Environmental Conditions

Precautions

A GCP representative should be consulted prior to application 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 effects on adjacent building elements. Injection has the potential to cause hidden damage if installed incorrectly.

Limitations

Low temperatures will significantly extend set times. Bring the 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 ºF WHEN WARMING. (CAUTION—pH NOTICE. Water used on site to activate grouts must be in a range of pH 5.5–7 for optimum grout quality. Varying water pH will cause the reaction times to change. Test ground water for pH and consult with GCP to ensure the pH falls within the threshold limitations.)

Storage & Handling

All PREPRUFE® SCS waterproofing system grout components should be shipped and stored in cool, dry, protected conditions at temperatures between 40°F and 77°F, out of direct sunlight and in accordance with the relevant site health & safety regulations. Do not thin with solvents. Warning: Do not combine components other than mixing during field application, as this may cause an exothermic reaction with the production of intense heat, smoke and irritating fumes.

Store in unopened containers.

Shelf life

- SCS Grouts Part A & Part B – 6 Months
- SCS Grout Activator – 12 Months
- SCS Plus Membranes – 12 Months

Transportation Requirement

- SCS Grout Part A – no special requirement.
- SCS Grout Part B – freeze protect.
- SCS Activators – no special requirement
- Preprufe SCS Plus membrane – no special requirement

Shipping Requirements

- SCS Grout Part A + B = Not DG
- Activator part A- ok for partial shipment, follow SDS for bulk quantity shipment
- Activator Part B – HAZMAT shipping, follow material SDS
- Do not stack or palletize Activators A & B together

PREPRUFE® SCS Plus Membranes Physical Properties

PROPERTY	TYPICAL VALUE	TEST METHOD
Thickness	0.14 in.	ASTM D6525
Elongation at ultimate break	50%	ASTM D412
Tensile strength, film	500 psi	ASTM D412
Peel adhesion to concrete	5 pli	ASTM D903
Resistance to hydrostatic head	232 ft (70 m)	ASTM D5385[1]
Puncture resistance	185 lbs (820 N)	ASTM E154
Impact resistance, membrane	No change in appearance	SAE J400[2]
VOC permeance of BTEX and saturated TCE & PCE	Not Detectable (Membrane, Seam)	ASTM F 739 (Open loop)
Diffusion coefficient, TCE	<1.24x10x12m^2/s	Calculated
Diffusion coefficient, PCE	<1.45x10x12$^2m^2$/s	Calculated
Diffusion Coefficient, Benzene	<3.56 x 10-11 m2/s	Calculated
Diffusion Coefficient, Toluene	<1.52 x 10-11 m2/s	Calculated
Diffusion Coefficient, Ethylbenzene	<3.60 x 10-11 m2/s	Calculated
Diffusion Coefficient, Xylene	<7.53 x10-12 m2/s	Calculated
Methane Gas Transmission Rate after Soil Burial, (mL/day·m2·atm),	8	ASTM D 1434
Environmental Stress Cracking	PASS	ASTM D 1693

Footnotes:

1. Hydrostatic head tests are performed by casting concrete against the geotextile side of the membrane with a lap and then injecting grout into the 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 (70 m) head.

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

Supply of Components

Membrane Installation

PRODUCT NAME	DESCRIPTION	SUPPLY
PREPRUFE® SCS Plus Membrane	A unique composite sheet membrane LARR complaint methane barrier and waterproofing membrane applied vertically to the soil retention system serving as a channel to contain the flow of the post-injected grout.	Rolls, 40 in. (1 m) x 100 ft, with a lap extension on both sides to provide continuous membrane between rolls 1 roll per box 6 box/pallet
PREPRUFE® Detail Tape (LT or HC)*	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 1000 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
SWELLSEAL® WA	A caulk-applied hydro-swelling mastic for sealing around pipe penetrations, rebar, utility conduits, etc.	10.5 oz cartridges, 12 per box
PREPRUFE® 300R Plus membrane	A composite sheet membrane for transitions to other GCP waterproofing systems (top, bottom, sides).	Refer to GCP PREPRUFE® 300R Plus membrane data sheet

Injection Port Assembly Installation

PRODUCT NAME	DESCRIPTION	SUPPLY
PREPRUFE® SCS Injection Base	A specially designed component used to mechanically attach the injection tube to the membrane.	1000 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

Grout Injection

PRODUCT NAME	DESCRIPTION	SUPPLY
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 Plus 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.	28 fl oz cans
PREPRUFE® SCS Hydrophilic Grout Part B	Grout part B for injection into PREPRUFE® SCS Plus Membrane providing ultimate waterproofing protection.	5 gallon pails
PREPRUFE® SCS Hydrophilic Grout Part B Activator**	Activator used for Part B to provide for temperature flexibility during installation.	2 lb jars

Ancillary Products (if required)

PRODUCT NAME	DESCRIPTION	SUPPLY
PREPRUFE® Tieback Cover	A specially designed, two-part cover used to maintain waterproofing integrity at soil retention tieback heads.	Refer to GCP 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 GCP HYDRODUCT® 220 data sheet

* LT denotes Low Temperature (between 25°F (-4°C) and 86°F (+30°C)); HC denotes Hot Climate (50°F (>+10°C))

** Part B Activator is shipped as hazmat: corrosive

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