TECHNICAL DATA SHEET

ShieldPoly TSL

ShieldCrete®

Thin Skin Structural Liner

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Product Description

ShieldPoly TSL (Thin Section Liner) is a structural, fire-resistant polyurethane designed for the consolidation of stressed rock structures associated with mining to prevent unravelling of strata and the associated risks, as well as lining and structural rejuvenation of concrete, brick, plastic and steel tunnels, pipes, and culvert sections. It is perfect for reinstating the structural performance of deteriorated concrete structures in water and wastewater, retaining structures, etc.

ShieldPoly TSL is a two-component hard, tough, elastomeric material that is applied through low pressure plural component machinery with a static mixer, or through a plural component machine with an impingement mix gun. No heat is required but is recommended to accelerate the gel time and make it easier to spray (particularly for overhead). The product is flexible with good elongation and high early compressive and tensile strengths. Adhesion is outstanding, even to damp surfaces. 60 to 70% of the physical properties are achieved in 4 hours (depending on ambient temperature) although set time is only 2-5 minutes (less when heated).

Technical/Performance Data

Tensile Strength (ISO 527)	>35 MPa
Elongation (ISO 527)	>8%
Compressive Strength (ASTM D695)	Fully cured >60MPa 20MPa after 30 minutes >50MPa after 48 hours
Return to Service	1 hour
Shore D Hardness (ASTM D2240)	>70
Flexural Modulus (ASTM D790)	>1400 MPa
Flexural Strength (ASTM D790)	>60 MPa
Water Absorption (ASMT D570)	No Change
Abrasion Resistance (ASTM D4060-14 CS-17 Wheel, 1000 cycles)	30mg
Water Vapour Permeability (ASTM E96)	>60% retention at 50 years

Typical Wet Properties

Material Property	Component A (Isocyanate)	Component B (Resin)
Appearance	Brown translucent liquid	Clear, light-yellow liquid
Density (kg/L @ 25°C)	1.2	1.08
Viscosity (Cps @ 25°C)	200-300cps	500-700cps
Solids (mixed) by volume	100%	
Flash Point (Pensky Martens Closed Cup)	>93°C	
Theoretical Coverage	1L = 1mm thick over 1m^2.	

Benefits

Adhesion

ShieldPoly TSL bonds to a wide variety of substrates including timber, steel, concrete, rock, brick, etc. It even bonds to damp substrates without foaming.

Toughness and Flexibility

ShieldPoly TSL is extremely tough and can resist rock burps, heavy impact, and substrate movement. This is thanks to the combination of high tensile strength and flexibility. Reinforcement can be added for even more structural capacity.

Safety

No requirement to be handled other than connecting hoses to the material containers, drums or 1000 litre IBC's. This reduces hazards during transport, storage, and application. 100% solids, Zero VOC's.

Application Areas

- ✓ Rock support; tunnels and mines, cuttings.
- ✓ Suitable for lateral work and in shafts.
- ✓ Slope stabilization.
- ✓ Pipe-in-pipe repairs, concrete/brick sewer repairs.
- ✓ Any other situations where shotcrete is used.

Features

- ✓ High tensile strength
- ✓ High impact strength
- ✓ High Compressive strength
- ✓ Good elongation
- ✓ Outstanding adhesion
- ✓ Fire resistant
- ✓ Solvent free
- ✓ No raw material handling
- ✓ No batch mixing
- ✓ Applied at 3+ mm thickness to suit structural requirements
- ✓ Can be applied by handgun or robotic spray.

Application Guidelines

ShieldPoly TSL is normally applied through a plural component reactor with impingement gun. Low pressure plural component spray units can be used with in-line static mixer and standard gun, but gel times may prevent this. A low-pressure low temp plural pump with disposable static mixer tip with atomiser may also be used. In low volumes it can also be sprayed using a cartridge gun.

It is necessary to spray material into all cracks and fissures to "lock up" lose strata.

The material is thixotropic as it leaves the spray head which eliminates sagging and ensures the material stays where sprayed into cracks etc. The material is set up and tack free in 2-5 minutes depending on material, ambient and substrate temperature. The liner can be drilled through and if required rock bolts installed after 30 minutes.

Application Guidelines (cont'd)

Consult ShieldCrete® Services or your local distributor for design thickness recommendations.

Adhesion to damp substrates can be achieved, but it is recommended to remove standing water and dry the surface where possible. Trials may be necessary for some substrates.

Note: The manning's 'n' for this product is in the order of 0.009 for design purposes.

Colours

Standard grey/black/White and natural / cream. Custom colours can be produced on request but may require additional lead time and price premium. Contact your local distributor for availability.

Due to its aromatic composition, ShieldPoly F-15 will tend to yellow or darken in colour and will become matt after exposure to UV light. It can be top coated with an aliphatic polyurethane coating for a colour-fast finish.

System Specification

Primer

Refer to ShieldCrete® technical representatives and distributors for recommendations based on your specific application.

Recommended Thickness

Recommended minimum thickness for abrasion resistant duty is 3mm, 4mm for heavy abrasion. Recommended minimum thickness for waterproofing is 1.5-2mm. Contact your local distributor for application specific recommendations as some pipe in pipe application are 10's of millimetres thick.

Number of Coats

This product can be applied in thicknesses from 1mm up to several cm in one monolithic coat. To build to specification, allow just enough cure time for the first coat to become firm, and then spray the next coat. Do not exceed recommended recoat windows. When building to more than 4mm thickness, pause for at least 5 minutes every 3-4mm (approximately) to allow the coating to exotherm and cure evenly in the layers.

Sometimes two or more coats are applied using different colours as a visual wear indicator. The additional coats should be applied as soon as possible after the preceding coat has gone tack-free, but no longer between coats than the specified recoat window of 2 hours.

Contact your distributor for reactivation requirements for coating over cured product.

Topcoat

An aliphatic polyurea or polyurethane, or polyaspartic polyurea topcoat may be required for some applications, particularly where colour stability is required (this product is UV stable, but not colour stable). Contact your distributor for a range of options. The topcoat shall be applied as soon as possible following the final coat reaching tack-free status, with a maximum time between coats as specified by the recoat window of this product.

Storage and Handling Precautions

Containers should be stored with the seals intact and opened containers used first. Reaction with moisture/water in the A-Side can lead to dangerous build-up of pressure in the drums. Therefore, partially used containers must be re-sealed after use to prevent ingress of moisture.

Do not reseal containers once the contents have been used up. Minimum storage life of 9 months from date of manufacture for the A-Side, 12 months for the B-Side when stored at in-door ambient conditions (20-25°C) in un-opened containers. It is strongly advised to apply a blanket of dry nitrogen during long-term storage.

Packaging

20 litre pails (40L kits), 200 litre drums (400L kits), and 1,000 litre IBC's (2000L kits).

General Information

Consult the SDS for health and safety information. As a minimum, wear protective clothing, P2 mask or better for people in close proximity of the application (<5m), and avoid direct contact with raw materials.

Chemical Exposure Test Results

Chemical Exposure Test Results

Test Method	Chemical	Concentration.Weight%	8Hr	12Hr	1DAY	5DAY
ASTM D-3912	Sulphuric Acid	10%	C	C	C	C
ASTM D-3912	Sulphuric Acid	20%	C	C	C	C
ASTM D-3912	Sulphuric Acid	30%	C	C	C	C
ASTM D-3912	Sulphuric Acid	50%	C	C	C	C
ASTM D-3912	Acetone	100%	E	-	-	-
ASTM D-3912	Lactic acid	50%	A	A	A	A
ASTM D-3912	Brine salt water	310g/L	A	A	A	A
ASTM D-3912	Diesel Fuel	100%	A	A	A	A
ASTM D-3912	MEK	100%	E	-	-	-
ASTM D-3912	HCL	10%	C	C	C	C
ASTM D-3912	HCL	20%	C	C	C	C
ASTM D-3912	HCL	30%	C	C	C	C

symbolic description	
A	No visible damage
B	Slight surface change
C	Slight surface discolour, no hardness loss
D	Swelling, <48Hrs
E	Swelling, <24Hrs

DISCLAIMER

The information provided herein, especially recommendations for the usage and the application of our products, is based upon our knowledge and experience. Due to different materials and equipment used, as well as varying working conditions and environments beyond our control we strictly recommend carrying out intensive trials to test the suitability of our products regarding the required processes and applications. This data sheet is provided free of charge, and we do not accept any liability regarding the above information or regarding any verbal recommendation, except for cases where we are liable of gross negligence or false intention.