Enviro BSL

VLDPE FULLY WELDED BASEMENT SHEET MEMBRANE LINER

ENVIRO BSL is a VLDPE membrane which is supplied and installed as a fully sealed and welded membrane system which includes a single layer, which forms a flexible and durable basement membrane. ENVIRO BSL includes all accessories for service penetrations, through fixings and terminations. The liner is suitable for a range of underground structures providing a robust, sustainable, chemically resistant solution for waterproofing below ground structures.

FEATURES AND BENEFITS

- >100 year design life
- Extensive International Standards testing
- Fire rated
- Chemical resistant
- Able to extrusion weld
- Excellent elongation
- Durable and tough
- Australian made

APPLICATION SOLUTIONS

- Basements
- Slab on ground
- Lift pits
- Below grade water tanks
- Tunnels
- Flat and insulated roofs
- Cut and cover

PRODUCT INFORMATION

Packaging: Standard rolls 2m (w) x 25m (L) x 2.0mm thickness (includes signal layer, approximately 0.6mm).
Colour: Green signal layer/Black membrane.

WATERPROOFING

AUSTRALIAN MADE

Directions for Use

PREPARATION

Substrate surfaces onto which a waterproof membrane is to be applied shall be prepared by the addition of a shotcrete smoothing layer to remove local peaks and infill hollows, or a suitably smooth concrete or rock surface.

Surfaces on which waterproofing systems shall be installed shall be clean, free from loose aggregate, sharp protrusions, projecting tying wire, release agents and other substances which are likely to damage or affect the waterproofing system.

Large circumferential irregularities shall not exceed 200mm when measured from a 1.0m curved edge held against the tunnel circumference. Any curvature or irregularity shall have a radius greater than 200mm. In areas where curvature is more than this value the Envirosystems Technical representative shall be required to inspect and deem if acceptable with the use of double geotextile fleecing, etc.

The shotcrete (including smoothing layer) shall be cured for at least 24 hours prior to membrane placement.

Steel elements, such as reinforcement bars, and the heads of rock bolts or anchors shall be covered with at least 20mm of shotcrete (or other approved method).

Running water ingress shall be plugged prior to the initial lining of the basement with geotextile. Where heavy water ingress is encountered it, shall be collected into half-pipes (e.g. flexi-drain or strip-drains, etc.), mounted by nailing and led into the permanent drainage system as appropriate.

If water is later found excessively penetrating through the shotcrete lining, which can adversely affect the installation of membrane, the water shall be collected by means of hoses and temporarily drained to the basement sump (i.e. during concrete lining pour, etc.).

The drainage shall be maintained during the membrane installation process so that no water pressure can develop behind the membrane.

ENVIRO BSL is to be installed over non-woven geotextile of not less than 700gsm.

APPLICATION

ENVIRO BSL must be installed by an approved, specialised applicator. Experienced in installation techniques and testing is essential.

Following installation of geotextile, the compatible roundels are nailed to the surface using a suitable nail gun. Roundels shall be set in a pattern to adequately support the membrane. This will vary between walls and base slabs.

ENVIRO BSL shall be attached to the roundels by hot air ‘spot’ welding.

The membrane shall be laid with sufficient slack (quilting) to avoid potential overstressing of the membrane sheet and possible tearing during concreting. However, it should not be installed too loose, that the membrane folds over itself during concrete placement (the membrane should be pressed against the surface during concreting).

Adjacent sections (rolls) of ENVIRO BSL shall be overlapped by approximately 100mm and joined by double seam welding.

Double seam welds are to be tested by applying pressure to the gap between the welds.

Areas where a double seam weld is not possible, a hand weld is to be employed. These welds are to be tested by nail test, or if profile permits a vacuum test.

Hand welds can then be extrusion welded to give hand welds a double weld.

Product Data

PHYSICAL PROPERTIES

PROPERTY	TEST STANDARD	REQUIREMENT VLDPE	RESULTS
Appearance	BS EN 1850-2	Full surface bond of the signal layer with the base material, free from bubbles, cracks, and entrapped air	Complies
Straightness and Flatness	BS EN 1848-1:2000	g ≤50mm p ≤10mm	g ≤50mm p ≤10mm
Minimum Thickness	BS EN 1849-2	≥2mm	≥2mm
Nominal Thickness	BS EN 1849-2	≥2.1mm	≥2.1mm
Thickness of Signal Layer	BS EN 1849-2	≤0.6mm	Complies
Density (Tolerance)	BS EN 1183-1	<±0.005g/cm^3	<±0.005g/cm^3
DSC-Analysis and IR Spectroscopy	BS EN ISO 11357-1 BS EN ISO 11357-3 ASTM E334	Individual evaluation of diagram	Complies
MFR (Melt Mass-Flow Rate)	BS EN ISO 1133-(Method A)	Nominal value ±15%	Complies
Tensile Strength	BS EN ISO 527-1 BS EN ISO 527-3 BS EN ISO 527-5	≥15N/mm^2	>23N/mm^2
Elongation at Failure	BS EN ISO 527-1 BS EN ISO 527-3 BS EN ISO 527-5	≥500%	≥500%
Elastic Modulus E1-2	BS EN ISO 527-1 BS EN ISO 527-3 BS EN ISO 527-5	≤100N/mm^2 (Figure 4.3)	≤100N/mm^2 (Figure 4.3)
Puncture Resistance	BS EN ISO 12236	>2.8kN	3.5kN
Burst Strength (D = 0.2m)/Multi-Axial-Elongation	BS EN 14151	≥50%	168%
Impact Resistance (500g)/Dynamic Perforation	BS EN 12691	Watertight at ≥750mm	Watertight at 970mm
Behaviour Under Hydrostatic Pressure (10bar/24 hours)	BS EN 1928	No leakage	Complies
Heat Distortion/Dimension Stability	BS EN 1107-2 BS EN 1850-2	≤2.0% (6 hours/80°C)	1.66%
Behaviour After Heat Exposure	BS EN 1107-2 BS EN 1850-2	Free from bubbles	Complies
Environmental Stress Cracking	BS EN 14576	>200 hours	Complies

Product Data

PHYSICAL PROPERTIES (CONTINUED)

PROPERTY	TEST STANDARD	REQUIREMENT VLDPE	RESULTS
Oxidation Resistance 90 days/85°C			
Change of Tensile Strength	BS EN 14575	≤20%	7%
Change of Elongation		≤20%	6%
Behaviour After Storage in Aqueous Solutions: 90 days/23°C $Ca(OH)_2$			
Change of Tensile Strength	BS EN 14415	≤25%	LD: 4%, TD: 8%
Change of Elongation		≤25%	LD: 11%, TD: 13%
Low Temperature Behaviour		No cracks at -20°C	Complies
Behaviour After Storage in Aqueous Solutions: 90 days H_2SO_3 (5 - 6%)			
Change of Tensile Strength	BS EN 14415	≤20%	LD: 3%, TD: 14%
Change of Elongation		≤20%	LD: 5%, TD: 10%
Low Temperature Behaviour		No cracks at -20°C	Complies
Behaviour After Storage in Warm Water Solutions: 70 days/70°C			
Change of Tensile Strength	EN 1296	<20%	8%
Change of Elongation		≤20%	5%
No Cracks at -20°C		Fullfil	Complies
Water Absorbtion	EN ISO 62	≤20%	0.05%
Tear Resistance	EN 12310	80N/mm	194.5N/mm
Root Pentration Test	EN 14416	No pentration	Complies
Reaction to Fire	BS EN ISO 11925-2 BS EN 13501-1	Minimum Class E	Complies
Weld Execution	BS EN 12316-2 BS EN 12317-2	Free from defects	Complies
Behaviour of the Welding Seam at Shearing	BS EN 12316-2 BS EN 12317-2	Break outside seam	Complies
Short-Time-Jointing-Factor fz	BS EN 12316-2 BS EN 12317-2	0.6	Complies
Behaviour of the Welding Seam at Peeling	BS EN 12316-2 BS EN 12317-2	Peeling is allowable, if resistance to peeling is reached	No peeling of weld
Resistance to Peeling	BS EN 12316-2 BS EN 12317-2	6N/mm	8.5N/mm
Dielectric Constant	ASTM G62	N/A	12.3kV/mm
Breakdown Voltage	ASTM G62	N/A	26.1kV
Micro-organism Change of Tensile Strength and Elongation	BS EN 12225	≤10%	<5%

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