

BluSeal HDPE Liner

HDPE Sheet Membrane

Material Description

BluSeal HDPE is supplied and installed as a fully sealed and welded, robust lining system.

BluSeal HDPE Liner is a synthetic liner of HDPE sheet which forms a durable liner. **BluSeal HDPE Liner** is used for lining dams and underground structures. **BluSeal HDPE Liner** comes in a range of thicknesses for various performance applications. The membrane is applied to structures to prevent water inflow and provide asset protection.

The liner is suitable for a range of underground structures providing the most robust and reliable solution available for concrete protection and water infiltration management. Under the supervision of Bluey Engineers and trained installers, **BluSeal HDPE Liner** can be applied to tunnels, basements and other structures as either a tanked or drained lining system. **BluSeal HDPE Liner** is designed and installed in accordance with International standards.

Characteristics and Benefits

- High tear strength and elongation
- Exceptional waterproofing performance
- Good weldability
- 120 year design life
- International Standards testing
- Fire rated
- Able to be extrusion welded

Areas of Application

- Lining bored and driven tunnels
- Cut and cover tunnels
- Green roofs
- Cross passages
- Underground structures
- Flat and insulated roof structures

Application Specification

Preparation

1. 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.
2. 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.
3. Large circumferential irregularities shall not exceed 50mm when measured from a 1.0m curved edge held against the tunnel circumference.
4. The shotcrete (including smoothing layer) shall be cured for at least 24 hours prior to membrane placement.
5. Steel elements, such as reinforcement bars, steel girders and the heads of rock bolts (as far as not used to hold inner lining structures) shall be covered with at least 20mm of shotcrete (or other approved method).
6. Depth pins shall be cut flush with the surface and patched with mortar.
7. Running water ingress shall be plugged prior to the initial lining of the tunnel 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.
8. 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 tunnel invert (i.e. during concrete lining pour, etc.).
9. The drainage shall be maintained during the membrane installation process so that no water pressure can develop behind the membrane.
10. BluSeal HDPE Liner is to be installed over non-woven geotextile of not less than 700gsm.

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Application

1. **BluSeal HDPE Liner** must be installed by an approved, specialised applicator. Experienced in installation techniques and testing is essential.
2. 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 the tunnel crown, walls and invert.
3. **BluSeal HDPE Liner** shall be attached to the roundels by hot air 'spot' welding.
4. Adjacent sections of **BluSeal HDPE Liner** shall be overlapped by approximately 100mm and joined by double seam welding.
5. Double seam welds are to be tested by applying pressure to the gap between the welds.
6. 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.
7. Hand welds can then be extrusion welded to give hand welds a double weld.

Performance Data

Description	Standard	Requirement HDPE
Thickness	EN 1849-2 (DIN 16726)	3 ± 0.2mm
Mass per unit area/density (Tolerance/internal audit)	EN 1849-2	≥0.94
Appearance	EN 1850-2 (DIN 16726)	Free from blisters, cracks, external capsule and voids
Straightness: Flatness	EN 1848-2 (DIN 16726)	50mm (10mm)
DSC Analysis (Internal Audit)	EN ISO 11357-1/3	Individual evaluation of diagram
MFR (Melt-flow-index) (Internal Audit)	EN ISO 1133, 190°C, m = 2.16kg or 5kg	Individual tolerance: ± 15%
Tensile Strength	ISO 527-1/3/5 (DIN 16726 EN 12311-2)	25MPa
Elongation	ISO 527-1/3/5 (DIN 16726 EN 12311-2)	≥ 700%
Low Temperature Behaviour	EN 495-5	≤ -20°C

Product Specification Clause

HDPE FLEXIBLE SHEET LINER - The HDPE Sheet Liner used for this project shall be supplied and installed as a fully sealed and welded robust membrane system. It shall be a pre-fabricated product that has independent testing to validate the performance outlined in the technical data table on the following pages. BluSeal HDPE Liner manufactured by Bluey Technologies or equivalent shall be accepted.

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Performance Data (cont'd)

Description	Standard	Requirement HDPE
Heat Distortion/Dimensional Stability (6 hours/80°C) Behaviour After Heat Exposure	EN 1107-2 (DIN 16726)	≤0.5
Burst Strength (D = 1.0m)/Multi-Axial-Elongation	EN 14151	≥15%
Impact Resistance (500g)/Dynamic Perforation	EN 12691 (DIN 16726)	>2000mm (for 0.6mm)
Behaviour Under Hydrostatic Pressure 5 bar/72 hours (10 bar/24 hours)	EN 1928 (DIN 16726)	No leakage
Elastic Modulus EI-2 (Material Flexibility)	ISO 527-1/3/5 (DIN 16726)	950N/mm ²
Behaviour After Storage in Aqueous Solutions 28 days/23°C Change of Tensile Strength Change of Elongation at Break No Cracks at -20°C	EN 1847 (DIN 16726) H ₂ SO ₃ (5-6%); Ca(OH) ₂ (sat.) NaCl (10%)	≤5% Fulfil
Thermal Ageing (70 days/70°C /hot air) Change of Weight Change of Tensile Strength Change of Elongation No Cracks at -20°C	EN 1296, EN 14575 (DIN 16726)	≤2%, ≤20% (≤20%)
Behaviour After Storage in Warm Water (8 months 50°C/Weekly Exchange of Water) Change of Weight Change of Tensile Strength Change of Elongation No Cracks at -20°C	EN 14415 (DIN 16726)	N/A
Micro-Organism Change of Tensile Strength and Elongation	ISO 527-3/5	≤10%
Reaction to Fire	EN 13501-1	Minimum Class E (B2)
Welding Behaviour Behaviour of The Welding Seam at Shearing Short-Time-Jointing-Factor fz Behaviour of the Welding Seam at Peeling Resistance to Peeling	DVS 2225-2/5, EN 12317-2, EN 12316-2	Break outside seam, 0.6, Peeling is allowable if resistance to peeling is reached 6N/mm

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Disclaimer

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This Technical Data Sheet is provided for general information and instruction only. The properties and characteristics set out herein represent typical testing results under laboratory conditions. Results of actual product characteristics may vary slightly. Site-specific and project-specific conditions may affect product performance, including without limitation: surfaces, environmental conditions, contact conditions, storage conditions, storage timeframes, weather, and climatic or seasonal conditions. Not all product parameters are batch tested as part of the manufacturing quality control process, and performance may vary between batches.

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