Technical Data Sheet

BluSeal AKS

HDPE CONCRETE PROTECTION MEMBRANE

BluSeal Anchor Knob Sheet (AKS) is supplied and installed as a fully sealed and welded robust chemically resistant concrete protection lining.

BluSeal AKS is a synthetic membrane of HDPE sheet with integral anchors which are cast into concrete to form a flexible and durable corrosion protection lining. BluSeal AKS is used to protect concrete surfaces in chemically aggressive environments in sewerage tunnels, treatment works, pump stations, manholes and chemical retention bunds. It comes in a range of colours and thicknesses and can be applied to new and existing structures for protection or enhancement.

Application Advantages

- Fully welded homogenous lining
- Complete before 28-day concrete cure
- Factory assured thickness and absence of pinholes
- Retro-fitted lining is moisture compatible with assured bond

Lifecycle Advantages

- 100 year design life
- Membrane drainage eliminates negative pressure
- Chemical and impact resistant
- High anchor pull-out resistance
- Potable Water use to AS/NZS 4020:200
- Low coefficient of friction in lined conduits

About the Product

BluSeal AKS is supplied and installed as a fully sealed and welded, chemically resistant concrete protection system. The system includes propriety details for sealing around penetrations and against non-HDPE surfaces. Skilled applicators can fabricate the product into various shapes to suit irregular concrete formwork. All seams and joins are extrusion welded and then tested by spark or vacuum box testing. BluSeal AKS is designed and installed by approved applicators to international standards which are outlined in a manufacturer's installation manual. The elasticity of the membrane allows free drainage and relief of any hydrostatic pressure build-up in underground structures. The membrane can be cast into new structures or retrofitted by cement grouting onto the prepared surface of existing structures. AKS lined structures have an outstanding track record in aggressive environments, demonstrating a design life in excess of 100 years for the most demanding applications.

Application solutions

- Segmental sewer tunnels
- Inlet works and bioreactor tanks in WWTP
- Pump stations and manholes
- Tunnel waterproofing
- Chemical retention bunds
- Piles and foundation lining in aggressive ground conditions
- Sewer pipelines
- Slide pads on pipe plinths
- Concrete protection for industrial applications

Project Specification Clause

HDPE CORROSION PROTECTION LINING - The HDPE CPL membrane used for this project shall be supplied and installed as a fully sealed and welded robust continuous membrane system. It shall be a factory produced product that has independent testing to validate the performance outlined in the technical data table on the following pages. BluSeal AKS supplied by Bluey Technologies or equivalent shall be acceptable.

Project Examples

Sewerage treatment plants, sewer pump stations, sewer manholes, trunk sewer mains, chemical processing plant bunds and trenches, gas pipelines (pipe plinths).

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Application Specification

PREPARATION

1.1 BluSeal AKS must be installed onto formwork under the direction of an approved, specialised applicator who will plan layout configurations of sheets and weld seam locations. The applicator may also prefabricate some corner or seam sections and pipe penetration pieces offsite.

1.2 At joins in sheets the edge knobs are removed from one edge and the sheet is overlapped by 50mm to prevent egress of concrete fines and to provide a sound foundation for welding the seams.

1.3 Formwork shall be cleaned and free of defects. Form release oils are not necessary where BluSeal AKS is applied. Formwork should be designed to avoid leaking.

1.4 The sheets must be tensioned over the form within the yield elongation limit, prior to securing to the forms.

1.5 BluSeal Formtak can be used to assist in holding the sheet against timber formwork. Securing against the formwork is by nailing or stapling through the sheets at edges where extrusion welds will cover later or into edges that will be redundant and trimmed after the pour.

1.6 On circular forms, the sheets are wrapped and tensioned around and secured at the overlap by wires around the knobs and/or temporary speed welding along the seam.

1.7 In precast concrete applications the moulds may be designed to secure the membrane at the edges.

1.8 When BluSeal AKS is applied to an existing structure all corroded concrete and contaminants must be removed, leaving a surface profile greater or equal to CSP4 in accordance with ACI guidelines.

1.9 Treat or replace exposed reinforcement in accordance with ACI guidelines.

1.10 Refer to Bluey Technical Notes for recommendations regarding proving grout bond strength and design criteria.

APPLICATION

2.1 Always pour concrete or grout at a cooler ambient temperature than the temperature when the sheets were applied to the formwork. This will ensure the membrane is taut on the forms.

2.2 Anticipated maximum concrete temperature or accelerated curing temperature should not exceed 60 degrees Centigrade. Contact Bluey to discuss exceptions.

2.3 When grouting the sheets onto an existing structure, only grouts approved by Bluey such as BluCem HS200 shall be used, and mixing and placement shall be strictly in accordance with Bluey instructions. Fast set grouts, such as BluCem HE80, are recommended to be used for retrofitting the membrane in short time frames where assets must be returned to service quickly.

2.4 When grouting the membrane to floors, plan pours at times of the day where temperature changes before initial set of the grout are minimal. Avoid these pours in direct sunlight.

2.5 Concrete mix design, mixing, placement and compaction of concrete should follow standard civil construction practice to minimise voids and ensure full encapsulation of the anchors on the membrane.

2.6 Extrusion welding and weld testing at seams will be undertaken by approved applicators and in accordance with installation guidelines provided by the manufacturer and generally in accordance with DVS 2227. This includes proper preparation of the sheet surfaces to be welded and daily destructive seam peel tests sampled from trial welds. Welding technicians shall have formal industry training in extrusion welding techniques.

2.7 Non-destructive testing of completed welds will be either by vacuum box or spark testing.

2.8 Repairs and patching will be completed by extrusion welding over small defects or applying a minimum 200mm diameter patch over larger defects, with a minimum 80mm edge distance to the defect.

2.9 Destructive pull testing of anchors should be avoided.

2.10 Encapsulation of anchors can be easily checked by tapping across the surface of the membrane to detect any hollow sounds that indicate voids under the membrane. If voids are detected, they can be filled by injection of BluCem HS200 high flow grout through the lining. Repair by extrusion welding over the injection hole.

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Product Data

Please refer to Important Notice on following page

Length of Knobs (nominal)	12mm
Knobs per m²	1230
Pull-off Resistance	>700N per knob or 850kPa (short term loading)
Membrane Thickness	2.0mm to 10mm*
Roll Widths	Up to 3.2m
Colours	Black for UV exposed applications and light colours (such as white) for underground or covered structures.

TESTED CHARACTERISTIC	STANDARD	RESULT			
Density	ASTM D 505/D 792	≥940kg/m³			
Carbon Black Content**	ASTM D 1603	2.0 - 3.0%			
Carbon Black Dispersion**	ASTM D 5596	Category 1 or Category 2			
ESCR (NCTL)	ASTM D 5397	>300 hours			
OIT	D 3895	>100 minutes			
Coefficient of Linear Expansion	ASTM E 831	1.1 - 1.4E-4cm/cm/deg C			
Tensile Properties (Sheet Material)	ASTM D 6693-04	Yield Stress 15MPa	Break Stress 27MPa	Yield Elongation 12%	Break Elongation 700%
Shore Hardness	DIN 53505	>50 Shore D			
Tear Resistance	ASTM D 1004	120N/mm			
Puncture Resistance	ASTM D 4833	300N/mm			
Dimensional Stability	ASTM D 1204	<2.0% change			
Water Absorption	ASTM D 570	<0.09%			
Flammability	UL94***	V0			

** Average minimum thickness to ASTM D 5199. Minimum thickness membrane made to order*

*** Black AKS only*

**** Plastics flammability standard released by Underwriters Laboratories of the USA*

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Contact Bluey

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IMPORTANT NOTICE

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.

If Bluey gives any express written product warranty in relation to the product, that warranty is subject to the foregoing qualifications, despite anything to the contrary in any other document. All other representations, advice, suggestions or promises regarding the product's performance or its implementation, whether verbal or in writing, and whenever given, including in the course of any field services, are expressly disclaimed. Without limiting the foregoing, Bluey will have no liability for loss or damage of any kind if any application specifications are not followed.

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