

PMC Liner System Product Specifications

Introduction

This document covers the product specification for Infrastructure Technologies' cementitious coated geotextile geocomposite lining system known as the 'PMC Liner System^{TM1}', which may be used in, but not limited to, the lining of aqueducts, channels and water storage facilities, erosion control, protective barriers.

The PMC Liner SystemTM is a "fit for service" composite membrane that can designed and specified to provide efficient long term reliable, durable and cost effective performance in water proofing, barriers and water shielding.

The PMC Liner SystemTM is a two component product consisting of,

- cushioning geotextile layer (specified to meet design requirements)
- a protective impregnating coating (PCS-3LV, polymer modified cementitious silica)

The geotextile layer can be specified to meet design requirements for the stratum, environmental and mechanical impact on the PMC Liner SystemTM → allowing for an extensive and flexible design options.

Technical Aspects (Material Analysis)

The individual components of the PMC coating are mainly inorganics (55% by weight) such as sand, clay, chalk, cement and silicas that have be used since antiquity and are well known for their durability and outdoor stability.

The polymeric binder of the PMC liner is based on a dispersible EVA powder which has been used in exposed architectural applications such as mortar, render, top-coat and adhesive compounds since the 1960's. The chemical structure of the dispersible EVA powders lacks any molecular chain backbones groups or linkages that are hydrolyzable or chemically degradable by long-term contact with water. Hence these coatings exhibit good stability against hydrolysis or chemical breakdown involving containment and contact with water.

The polypropylene geotextile support exhibits good outdoor stability provided that the fibres are screened from the damaging effects of sunlight. An important function of the PCS-3LV coating is to protect the polypropylene fibres of the geotextile from heat and UV and chemical degradation. In the absence of UV exposure such PP geotextiles are anticipated to last over 100 years (see attachment).

The PCS-3LV coating has a high inorganic content and provides good abrasion resistance to high sediment loads. There will however be an inevitable, gradual loss of inorganic particles and erosion of the binder leading to a slow loss of coating thickness. The coating is easily repairable by reapplying the PCS-3LV coating as per the approved SWMS.

The EVA dispersible powders are not re-emulsifiable and once dried and desiccated by the reaction with cement form a water-proof stable network are not effected by repeated wetting/drying cycles or rehydration.

¹ Patent Pending

Critical Performance Properties

The following table provides the key performance properties for the PMC Liner System™.

Physical Properties	Mechanical Properties	Durability Properties
Thickness Coating Weight Density and Hardness	Tensile Modulus (stiffness) Tear and Puncture	Water Resistance Heat resistance UV Resistance

PMC Liner System™ — Table of Critical Performance²

Property	Test Method	Value
Thickness	ASTM D5994	3-4 mm
Mass per Unit Area	ASTM D1593	5 kg/m ² (5 mm build)
Hardness (Shore A Durometer)	ASTM D2240	82 (after 7 days)
Grab Tensile Strength	ASTM D751	85 kN/m
Tensile Elongation	ASTM D751	Coating > 150% Geotextile > 12%
Tear Resistance	ASTM D751 (tongue)	900 N (min.)
Puncture Resistance	ASTM D4833 (rod)	800 N (min.)
Drying Time	ASTM D1640	dry to touch in 4 hours
Adhesion (Cross Cut)	ASTM D3359 A	the dried coating exhibits no loss of adhesion from the substrate
Flexibility (bending around 10mm mandrel)	ASTM D522 B	the dried coating exhibits no cracking
Resistance to Water (Standard Practice for Testing Water Resistance of Coatings Using Water Immersion.)	ASTM D870	the dried coating exhibits no blistering, re-emulsification or colour change
Flaking	ASTM D662	the dried coating exhibits no flaking
Cracking	ASTM D661	The dried coating exhibits no cracking or breaking
Flexural testing	ASTM D790	No cracking of coating
UV Resistance (accelerated test of 1600 hrs QUV and ongoing)	ASTM D7238	No cracking after 1600 hrs (onset of chalking, binder erosion)
Carbon Black Content	ASTM D4218	not applicable
Carbon Black Dispersion	ASTM D5596	not applicable
Inorganic Content	ASTM D4218	55% (nominal)
Fire Resistance	UL 94	Surface burn only (no burn through). Does not propagate flame and is self extinguishing.

² Test results for PCS-3LV 3mm coating on a 450gsm geotextile base of fibreglass reinforced: 90Kn per sqm, stitched to a nonwoven polypropylene geofabric

PMC Liner System™ Logistics

Delivery and Acceptance

The supply of PMC Liner System™ is a two part construction system;

1. Geotextile
2. PCS-3LV dry material

The PMC Liner System™ materials shall be provided as specified. Each roll and PCS-3LV package shall be labeled so as to provide the following identifying data:

- Order Number
- Production description
- Roll/bag number
- Batch number
- Width / Weight
- Thickness
- Roll length / package weight

This information must be provided prior to or with delivery of all materials to site. All materials for the nominated works shall be certified prior to installation by the manufacturer's laboratory test reports.

The formulation and manufacture shall be uniform such that all properties detailed within the specification will be met at all times.

Transport, Handling and Storage

Materials shall be stored on site in an area that is dry and approved by the Superintendent. PCS-3LV shall not be used after a period of 6 months from manufacture date.

The Contractor shall be responsible for all freight/transportation to site and handling and storage on site, including site security.

Materials shall be stored in such a manner that no surface irregularities or other influences will apply point loads, abrasions, cuts or distortions or other forms of damage to the materials.

Quality Assurance and Compliance

Infrastructure Technologies (Australia) Pty Ltd provides specialised innovative products or a wide range of infrastructure applications. Our objective is to provide products and services which meet and exceed industry standards for quality, efficiency, cost and support.

In conjunction with independent and accredited testing agencies, Infrastructure Technologies (Australia) Pty Ltd provides and or approves application specific ITP and respective QA QC program for the ITM Liner™ System products to meet design and construction, OHS and environmental compliance for product supply placement and maintenance.

This Product Specification is independent of and does not warrant any Application Specification for the product use in the nominated design and construction application.

Infrastructure Technologies (Australia) Pty Limited
Level 8, 5-9 Harbourview Crescent,
Milsons Point NSW 2061 Australia
Telephone: +61-2-9923-2122
Facsimile: +61-2-9475-0250
www.infrastructuretechnologies.com.au

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ABN 85 106 302 452

Contact: Russell Hanna;
Email: rhanna@infrastructuretechnologies.com.au

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