

Permaliner™

Flexible Polypropylene (FPP) Geomembrane for Containment and Lining

Description

Permaliner FPP is a black, high specification geomembrane manufactured with optimum chemical and physical stability. Manufactured from polypropylene, Permaliner has excellent flexibility over a wide temperature range, maintaining resistance to tear, puncture and weld seam damage. The wide temperature range (- 40° C to 80° C) allows for many applications not suitable to other materials.

Flexible Polypropylene has the lowest density of any of the geomembrane materials providing for easier deployment of panels as well as the significant benefit of having one of the lowest water transmission rates of any of the common geomembrane materials. This makes FPP one of the most suitable waterproofing membranes available.

Permaliner has excellent UV resistance and retains flexibility even under extreme fully exposed weathering conditions. A 2.5% concentration of finest quality carbon with 97.15% polymer provides maximum protection against photochemical attack.

Permaliner FPP has a very high ESCR (Environmental Stress Cracking Resistance). ESC is promoted by such factors as chemicals, UV, temperature changes and ground settlement. The long-term flexibility and UV resistance is one of key reasons Permaliner is easily repaired if damaged, plus it has an extremely low co-efficient of linear thermal expansion (CLTE) to help prevent welded seam stress. Note: Permaliner FPP has superior dimensional stability with a CLTE half that of HDPE and LLDPE. The excellent puncture resistance of Permaliner FPP out performs other materials including LDPE and LLDPE.

Permaliner is a food and drinking water grade material (AS/NZS 4020:2005, FDA § 177.1210) with an excellent balance of chemical and UV resistance. It is 100% free of plasticisers, fillers, lubricants and other toxic stabilisers. This makes Permaliner ideal lining for tanks, reservoirs, horticultural and agricultural ponds and lakes.

Applications

Containment

Primary and secondary containment lining for a variety of applications including tank, pond and canal for potable water, fish breeding in fresh or salt water, horticultural, decorative ponds, lining of earth dams, sediment ponds. Also suitable for lining effluent ponds for dairy and pigs (also floating covers for odour control) and waste containment (see chemical resistance table at permathene.com for compatibility).

Lining

Suitable as methane gas barrier where specified as a one-piece membrane, with all panels welded and placed under concrete, or alternatively taped (see installation guidelines at permathene.com).

Selection Guide

The type and grade of liner selected is based upon several factors including cost, ease of handling, life expectation, mechanical resistance. For FPP, exposed linings we recommend a heavy grade where possible as the likelihood of mechanical damage is reduced. Exposed liners should always be fenced to prevent animals walking on the lining. Heavy geotextiles are used under the lining to prevent damage from rocks, tree roots, etc.



A lightweight (.5 mm or less) lining is generally used where on-site installation is not practical due to location or ground conditions. These lighter linings are economical, easily factory manufactured and can be installed by the owner. However, they are also more prone to damage. With proper care a service life of over 10 years can be achieved and even beyond 20 years. Liner failure is hardly ever caused by UV alone and is a combination of factors including heat, mechanical and chemical.

Permaliner Potable Water

Permaliner FPP (all grades) has been certified to meet AS/NZS 4020:2005 for use in contact with drinking water.

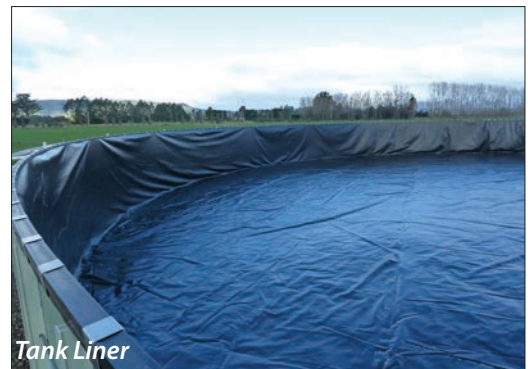
POTABLE WATER TESTED: AS/NZS 4020:2005

1. Taste of Water Extract: Passed
2. Appearance of Water Extract: Passed
3. Growth of Aquatic Micro-organisms: Passed
4. Cytotoxic Activity of Water Extract: Passed
5. Mutagenic Activity of Water Extract: Passed
6. Extraction of Metals: Passed

Testing at 20 degrees Celcius (+/- 2 degrees), at an exposure of 15000 mm2 per litre.



Methane gas barrier



Tank Liner

Physical and Mechanical Properties

PROPERTY	METHOD	UNITS	.3	.5	.75	1.0	1.5
Thickness	ASTM D 5199	mm	0.3	0.5	0.75	1.0	1.5
Specific Gravity	ASTM D 792	g/cm ³	.91	.91	.91	.91	.91
Melt Flow Index (230 deg C)	ASTM D 1238	g/10min	0.6	0.6	0.6	0.6	0.6
Tensile Strength at Yield (MD, TD)	ASTM D 6393 IV	kN/m	5, 4	5, 4	5, 4	5, 4	5, 4
Tensile Strength at Break (MD, TD)	ASTM D 6393 IV	kN/m	28, 22	28, 22	24, 20	22, 18	22, 22
Elongation at Break (MD, TD)	ASTM D 6393 IV	%	900, 900	900, 900	900, 900	900, 900	900, 900
Tear Resistance (MD, TD)	ASTM D 1004 C	N	25, 25	35, 35	45, 45	65, 65	65, 65
Puncture Resistance	ASTM D 4833	N	90	150	210	250	250
Water Vapour Transmission (23° C, 50% RH)	ASTM E 96	g/m ² /24hrs	-	-	-	0.1 - 0.12	-
Carbon Black Content	OEE 8.2.4-02-01	%	2-3	2-3	2-3	2-3	2-3
Carbon Black Dispersion	NFT 51142		≤ 3	≤ 3	≤ 3	≤ 3	≤ 3
Oxidative Induction Time	ASTM D 3895	min	> 100	> 100	> 100	> 100	> 100



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