PROTECT FROM CONTAMINANTS WITH AUSTRALIAN-MADE INNOVATION

SORBSEAL® HYBRID GEOSYNTHETIC CLAY LINERS

TECHNICAL DATA SHEET

Sorbseal® is a hybrid GCL (*h*-GCL) which comprises a high-performance powdered bentonite blended with a high-surface area powdered activated carbon specifically designed to prevent the transport of pollutants, such as PFAS, into the environment.

- Safely prevents the release of a wide range of PFAS and other harmful contaminants
- Effectively retains the performance of a standard GCL as a liquid barrier
- Engineered to meet the EPA's National Environmental Management Plan (NEMP) guidelines on maximum levels of PFOS, PFOA and PFHxS
- Can be customised to suit specific site chemistries for tailored solutions
- Applicable for Waste, Mining and Water sectors

SORBSEAL TECHNICAL DATA SHEET

PROPERTY	TEST METHOD	MQC[1] FREQUENCY	VALUE TYPE	UNITS	SORBSEAL GRADE	
					S1000	S2000
Bentonite Properties						
Montmorillonite Content	XRD	100 tonnes	Minimum	%	≥70	
Carbonate Content	XRD	100 tonnes	Maximum	%	≤2	
Bentonite Form[2]	NH_4^+ Exchange	100 tonnes	N/A	-	Na^+	
Bentonite Particle Size	Dry Screen	100 tonnes	Minimum	% passing 75µm	≥65	
Cation Exchange Capacity	Methylene Blue	100 tonnes	Minimum	cmol/kg	≥80	
Activated Carbon Properties						
Iodine Number	ASTM D4607	Per batch	Minimum	mg/g	≥1000	
Ash Content	ASTM D2866	Per batch	Typical[3]	%	10	
Moisture Content	ASTM D2867	Per batch	Maximum	%	≤3	
Particle Size (d50)	EN 12902	Per batch	Typical	µm	10 – 30	
Apparent Density	ASTM D2854	Per batch	Typical	g/mL	0.3 – 0.4	
Ball Pan Hardness	ASTM D3802	Per batch	Typical	%	80 – 90	
Bentonite/Activated Carbon Blend Properties						
Free Swell Index	ASTM D5890	50 tonnes	Minimum	mL/2g	≥24	
Fluid Loss	ASTM D5891	50 tonnes	Maximum	mL	≤18	
Geotextile Properties						
Cover Nonwoven Geotextile Mass	AS 3706.1	10,000 m^2	Typical	g/m^2	250	250
Carrier Woven or Woven/Nonwoven Composite Mass	AS 3706.1	70,000 m^2	Typical	g/m^2	110	360
Component Durability (60°C forced air oven for 50 days)	ASTM D5721/D5035	Annual	Minimum	% strength retained	≥65	≥65
Geotextile Configuration (Carrier / Cover)					W / NW[4]	W+NW / NW

SORBSEAL TECHNICAL DATA SHEET

PROPERTY		TEST METHOD	MQC[1] FREQUENCY	VALUE TYPE	UNITS	SORBSEAL GRADE	
						S1000	S2000
***h*-GCL Properties**							
Mass Per Unit Area	Total *h*-GCL Mass @ 0% Moisture Content	ASTM D5993	2,500 m^2	MARV[5]	g/m^2	5,160	5,410
	Total *h*-GCL Moisture Content	ASTM D5993	2,500 m^2	Maximum	%	≤15	≤15
	Bentonite Mass @ 0% Moisture Content	ASTM D4218 (Mod)[6]	Periodic	MARV	g/m^2	4,000	4,000
	Activated Carbon Mass @ 0% Moisture Content			MARV	g/m^2	800	800
Strength	Strip Tensile Strength MD[7]	ASTM D6768	10,000 m^2	MARV	kN/m	8	10
	Average Peel Strength	ASTM D6496	4,000 m^2	MARV	N/m	360	600
	Hydrated Peak Shear Strength[8] @ 10kPa	ASTM D6243	Periodic	MARV	kPa	30	35
	Hydrated Peak Shear Strength[8] @ 30kPa	ASTM D6243	Periodic	MARV	kPa	50	60
Hydraulic	Hydraulic Conductivity – DI Water	ASTM D5887	40,000 m^2	MaxARV[9]	m/s	5×10^{-11}	
	GCL Flux (35kPa) – 0.05M $CaCl_2$	ASTM D6766	Annual	MaxARV	$(m^3/m^2)/s$	1×10^{-07}	
	Edge Sealing Performance - Tap Water	ASTM STP 1308 (Mod.)[10,11]	Periodic	MaxARV	m/s	5×10^{-11}	
Roll Parameters	Roll Mass (Standard Roll Length)	In-house scales	Per roll	Typical	kg	1315	1370
	Standard Roll Dimensions				m	4.7 x 45	4.7 x 45

1. MQC = Manufacturing Quality Control - an ongoing system that monitors and tests materials during manufacture to ensure compliance with certification documents and contract specifications.
2. Bentonite Form – Natural sodium bentonites are classified as those having >50% exchangeable sodium (von Maubeuge, K., Egloffstein, T.A., 2004. Quality Requirements for Bentonite in Geosynthetic Clay Liners and the Validity of Test Methods). Bentonite used in all SORBSEAL GCLs comply with this requirement.
3. Typical = A typical value is the arithmetic mean of a set of results. This implies that 50% of the tested specimens will typically exceed this value and 50% will typically not meet this value.
4. W = Woven NW = Nonwoven
5. MARV = Minimum Average Roll Value – a MARV is defined as the Mean or Typical values less 2 standard deviations. Mathematically, it is implied that 97.5% of the results of the tested specimens will exceed the MARV. A MARV provides a confidence level of 97.5%.
6. Muffle Furnace – Average of 3 x 1g powder specimens extracted from the GCL, placed in a muffle furnace at 950°C for three hours, followed by weighing to determine the weight loss. Individual powder masses determined using a best-fit calibration curve derived from analysis on various blend percentages.
7. MD = Roll Machine Direction.
8. Peak Value reported. The reported values are not intended to replace site specific internal shear or interface friction testing required for design.
9. MaxARV = Maximum Average Roll Value – a MaxARV is defined as the Mean or Typical values plus 2 standard deviations. Mathematically, it is implied that 97.5% of the results of the tested specimens will be less than the MaxARV. A MaxARV provides a confidence level of 97.5%. NB.With reference to GCL Hydraulic Conductivity, LOWER IS BETTER.
10. Reference – Daniel, D.E. Trautwein, S.J. and Goswami, P.K. 1997. Measurement of Hydraulic Properties of Geosynthetic Clay Liners Using a Flow Box, Testing and Acceptance Criteria for Geosynthetic Clay Liners, ASTM STP 1308, p. 196-207.
11. Modification Reference – Kendall, P.M., Austin, R. A. 2014. Investigation of GCL Overlap Techniques Using a Large-Scale Flow Box, 7th International Congress on Environmental Geotechnics, 3B-3, p. 746-753.

Long-term PFAS attenuation performance will depend on PFAS type, chain length and concentration in conjunction with other contaminant types, loadings, hydraulic head pressure etc. Please contact the GRID (grid@geofabrics.com.au) to discuss suitability.