Unlaminated sodium bentonite GCL

Powder without polymer addition

Needle-punched GCL specifying Indian sodium bentonite powder with no polymer addition between polypropylene geotextiles. Codes below carry the GCL prefix.

Specified minimum and maximum supply values. Select the grade and production test schedule for the project.

Property	Test method or basis	Unit	Standard 37 S37U	Standard 40 S40U	Heavy Duty 37 H37U	Heavy Duty 40 H40U
GCL components						
Cover nonwoven PP mass	ASTM D5261	g/m²	≥200			
Carrier woven PP mass	ASTM D5261	g/m²	≥100			
Carrier nonwoven PP mass	ASTM D5261	g/m²	Not included		≥200	
Total carrier mass	Component minima	g/m²	≥100		≥300	
Dry bentonite mass at 0% moisture[1]	ASTM D5993 and records	g/m²	≥3,700	≥4,000	≥3,700	≥4,000
Bentonite properties						
Polymer addition	Formulation declaration	-	None			
Swell in reagent water[2]	ASTM D5890	mL/2 g	≥24			
Fluid loss[2]	ASTM D5891	mL	≤18		≤16	
Moisture content	ASTM D5993	%	≤13			
GCL properties						
Tensile strength MD and CMD	ASTM D6768	kN/m	≥10 / ≥10			
Internal GCL peel strength	ASTM D6496	N/m	≥360			
Static puncture strength CBR	EN ISO 12236	N	≥1,600		≥2,500	
Hydrated peak internal shear at 10 kPa normal stress	ASTM D6243	kPa	≥30		≥35	
Hydraulic properties[3]						
Hydraulic conductivity in fresh water	ASTM D5084 GCL setup	m/s	$\leq 5.0 \times 10^{-11}$		$\leq 3.0 \times 10^{-11}$	
Fresh water index flux q10[4]	ASTM D5887	m³/m²/s	$\leq 2.7 \times 10^{-9}$			
GCL overlaps and supply						
Factory longitudinal edge overlap	Accepted seam detail	mm	≥300			
End joints and field cuts on a base	Accessory bentonite treatment	mm	≥600			
Roll width and length	Common supply format	m	5 × 30			

1 Values are specified minimum and maximum acceptance limits. Dry bentonite mass covers the clay fraction, excluding polymer and geotextiles. Select each construction against its stated property schedule.

2 ASTM D5890: reagent water (distilled/deionised), at least 16 h after the final increment; extend/report as the method requires. Specify source and batch declarations for the unmodified sodium bentonite. Select saline applications using liquid-specific compatibility testing.

3 Hydraulic limits apply to the GCL under agreed confinement, gradient, hydration, liquid and equilibrium criteria. Assess joint performance separately. Use ASTM D6766 within scope for chemicals and report adaptations. Specify durability, cycling and protection testing to suit the application.

4 The Standard-grade fresh-water flux is a construction-specific acceptance target based on the same bentonite formulation as Heavy Duty. Specify ASTM D5887 acceptance testing for the selected construction and confinement.

Select for compatible low-salinity rainwater or subgrade moisture. Consider the polymer grade for greater drying resistance or aggressive hydration liquids, with formulation-specific testing. Cover promptly; permanent exposed service requires separate design.

Keep overlaps clean and in direct GCL contact under continuous confinement. Confirm factory edge treatment; use compatible accessory bentonite on untreated seams, ends and cuts. Slope end joints and repairs require project details. Agree roll dimensions and cores for the order.

Bentonite quality and Australian BPEM criteria

Minimum order: 3,000 m²

Indian sodium bentonite powder, without polymer modification. Supplier-declared specification limits are shown below.

Bentonite property	Supplier declaration
Origin and form	Indian sodium bentonite powder
Polymer modification	None
Montmorillonite content	≥75%
Methylene blue adsorption	≥300 mg/g
Swelling	≥25 mL (supplier reporting basis)
Fluid loss	≤18 mL
Water adsorption capacity	≥550%; DIN 18132 Enslin–Neff
Particle size	≥80% passing 75 µm
Cation exchange capacity	≥70 meq/100 g
Moisture content	≤13%
Calcium concentration	<2%

BPEM property	BPEM requirement	Supplier specification
Montmorillonite	>70 wt%	≥75%
Powder particle size	e.g. 80% passing 75 µm	≥80% passing 75 µm
Cation exchange capacity	≥70 meq/100 g	≥70 meq/100 g

The supplier-declared montmorillonite content, cation exchange capacity and powder grading meet the corresponding numerical criteria in EPA Victoria's BPEM Appendix E6.1. These source properties apply to the non-polymer range.

The bentonite supplier reports more than nine years supplying an established Malaysian GCL manufacturer whose products are supplied into Australia.

For BPEM projects, specify source certification, carbonate content, bentonite quality criteria, swell-test conditions and batch verification in the project quality plan. Link the bentonite and GCL quality records to the supplied rolls, with project-specific chemical compatibility, design and installation CQA.

Source data are supplier-declared specification limits. Swelling is quoted on the supplier's reporting basis; the GCL schedule defines the acceptance methods and units. Reference: EPA Victoria Publication 788.3, Appendix E6.1. The Heavy Duty schedule specifies a tighter fluid-loss acceptance limit of ≤16 mL.