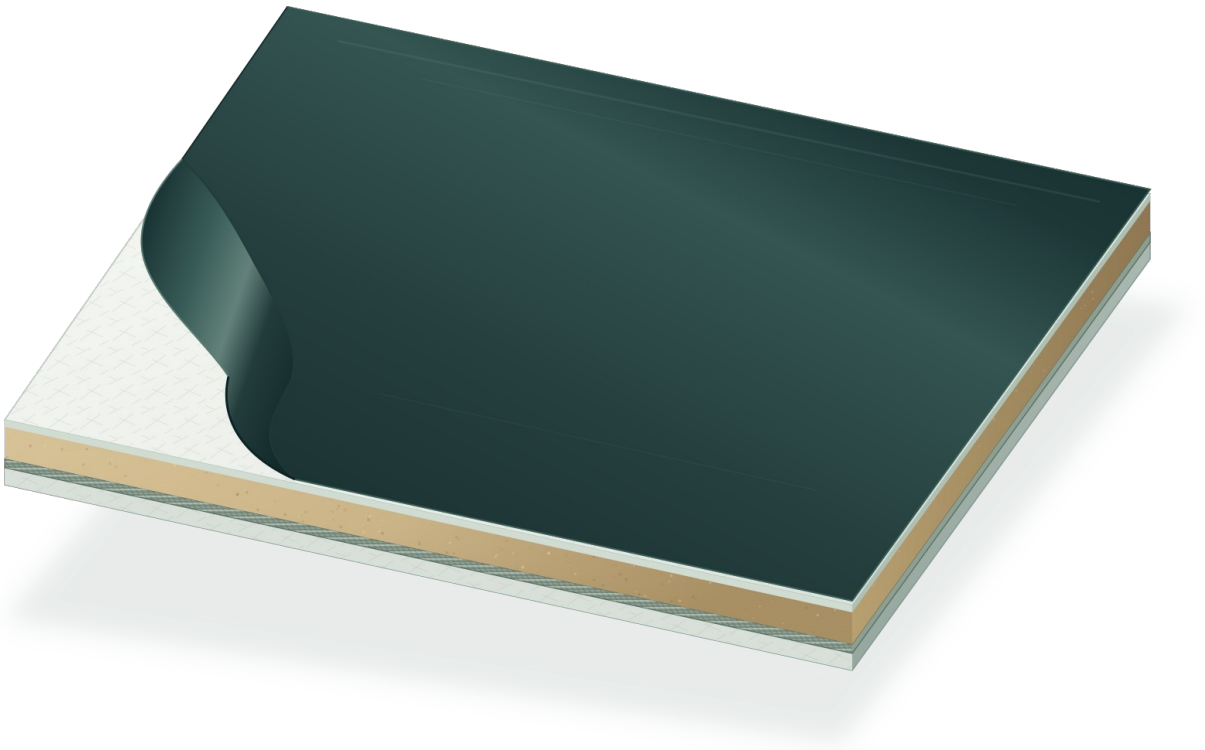
PRODUCT GUIDE

Heavy Duty Laminated GCL

Polymer-modified bentonite powder
with a bonded polyethylene surface



Conceptual construction illustration. Layer thicknesses exaggerated.

HDL-GCL 020	HDL-GCL 050
0.20 mm LDPE	0.50 mm LLDPE

One construction
Two film options

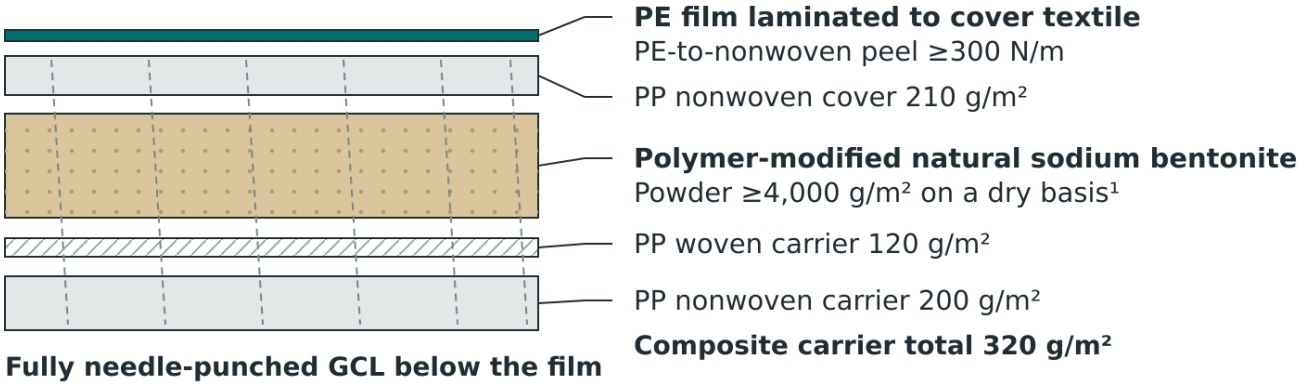
Kontain HDL-GCL combines a bonded polyethylene surface with a reinforced, needle-punched clay liner. Both grades use natural sodium bentonite powder with polymer modification, held between a nonwoven cover and a woven/nonwoven composite carrier.

The PE film is bonded to the upper nonwoven, with a specified minimum peel strength of 300 N/m. At designated longitudinal edges, 400 mm of film remains loose so the clay liners can make direct contact beneath the PE overlap.

Film option	HDL-GCL 020	HDL-GCL 050
Film thickness	0.20 mm nominal	0.50 mm nominal
Resin	LDPE	LLDPE

HDL-GCL construction

Schematic layer order



Fully needle-punched GCL below the film

¹ Dry bentonite mass; polymer additional. Layer thicknesses exaggerated; not to scale.

Construction values shown are specified requirements, not certified test results. The reinforced construction is common to both film options. Roll width, length and factory edge arrangements are agreed for each order.

The PE film is specified by nominal thickness and resin type. GM13 or GM17 compliance is not claimed.

Bentonite performance through drying and rewetting

Polymer modification improves the bentonite's response to saline fluids and helps resist cracking during drying and rewetting while the PE surface remains exposed before covering.



Wet–dry crack patterns in reference GCL (left) and polymer-modified GCL (right). Different constructions are shown.

Polymer modification helps limit crack development during drying and supports sealing as the bentonite rehydrates. Large desiccation cracks are harder to reseal, particularly where calcium-rich or saline water limits bentonite swelling.

Select the formulation for the expected contact liquids. Calcium-rich or lime-treated subgrades, saline pore water and acidic or alkaline liquids require compatibility assessment.

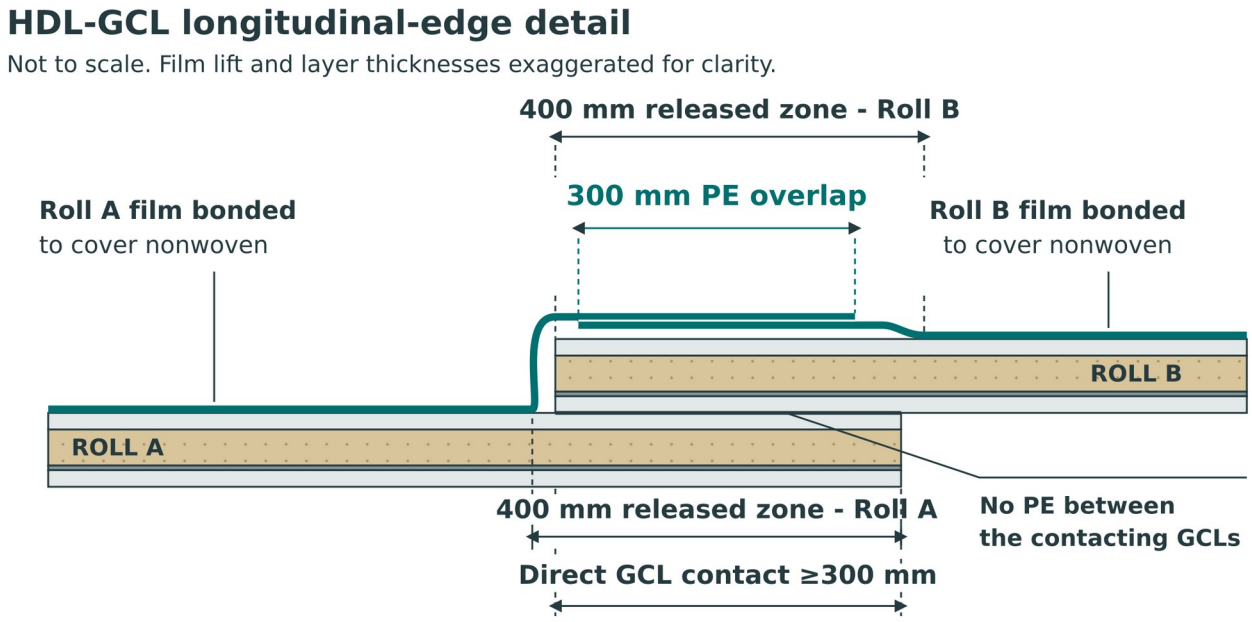
Cover the liner promptly and provide the specified confinement. Assess extended exposure through representative wet–dry testing with the expected contact liquids and conditions.

Check chemical compatibility using the actual subgrade and contact liquids. [1, 2]

[2] De Camillis et al. (2016), Geotextiles and Geomembranes 44(5), 739–747. doi.org/10.1016/j.geotexmem.2016.05.007.

Longitudinal edges
Loose film for sealing

The PE remains bonded across the main body of each roll. Loose film at the longitudinal edges allows direct GCL-to-GCL contact, with the PE returned over the joint to overlap the adjacent film.



Longitudinal edges only. Measure both finished overlaps with the film relaxed.

No wedge welding. Extrusion sealing: HDL-GCL 050 only, using a qualified procedure.

400 mm released film zone	300 mm PE overlap
Measured from designated longitudinal edges. PE remains as a loose flap.	The PE overlaps above the GCL joint. Provide at least 300 mm of direct GCL contact.

Use a project-approved detail for end laps and repairs that maintains direct GCL contact and PE coverage. Do not strip bonded film.

Extrusion sealing

Extrusion sealing is limited to HDL-GCL 050. Use a qualified procedure for the 0.50 mm LLDPE film, filler and laminated assembly. Do not extrusion-seal HDL-GCL 020.

Neither grade is wedge weldable. Unsealed PE overlaps rely on the GCL joint beneath them; the film overlap alone is not a watertight seam.

Technical properties

Both grades share a reinforced clay-liner construction. Select 0.20 mm LDPE or 0.50 mm LLDPE to suit the specified film and joint requirements.

Property	HDL-GCL 020	HDL-GCL 050
Film thickness	0.20 mm nominal	0.50 mm nominal
Resin	LDPE	LLDPE
PE overlap	300 mm	300 mm
Extrusion sealing	No	Qualified procedure
Wedge welding	No	No

Construction requirements and GCL reference properties

Property	Value	Test method
Bentonite core	Natural sodium powder with polymer	
Dry bentonite mass requirement	≥4,000 g/m², excluding polymer	
PP nonwoven cover	210 g/m²	ASTM D5261
PP composite carrier	120 woven + 200 nonwoven = 320 g/m²	ASTM D5261
GCL bonding	Fully needle-punched	
PE-to-nonwoven peel requirement	≥300 N/m	ASTM D6496 (adapted for PE/nonwoven)
Unmodified natural sodium bentonite swell	≥24 mL/2 g	ASTM D5890; reagent water
Polymer-modified natural sodium bentonite swell	>28 mL/2 g	
Polymer-modified natural sodium bentonite swell in saline fluid	>22 mL/2 g in 20,000 ppm salt water	
GCL peel strength	360 N/m	ASTM D6496
CBR puncture strength	≥2,500 N	EN ISO 12236
GCL hydraulic conductivity	≤3×10^{-11} m/s	ASTM D5084
GCL index flux q10	≤2.7×10^{-9} m³/m²/s	ASTM D5887
Hydrated internal peak shear	≥35 kPa at 10 kPa normal stress	ASTM D6243

Construction values are specified requirements. GCL mechanical and hydraulic values are clay-liner references, not certified test results for the finished powder/polymer laminate. Verify finished-product performance through product-specific testing.

GRI-GCL3 Rev 5 (21 November 2019), Table 1(a), uses ASTM D6768 for machine-direction (MD) GCL tensile strength. No product tensile result or GRI-GCL3 compliance is claimed.

EN ISO 12236 puncture, ASTM D5084 conductivity, ASTM D6243 shear and adapted PE/nonwoven peel are supplementary properties outside GRI-GCL3 Table 1. PE peel applies only to bonded areas, excluding loose edges.

ASTM D5890 applies to unmodified bentonite. Polymer-modified swell values and the 20,000 ppm saline condition are separate specifications, not the GRI-GCL3 calcium-chloride protocol.

Peak shear is not a design residual strength. The PE film is specified by resin type and nominal thickness; GM13/GM17 compliance is not claimed.

Quality requirements and project selection

Both grades use natural sodium bentonite powder. Kontain's bentonite requirements address the material criteria in EPA Victoria BPEM 788.3, Appendix E. [1]

Bentonite property	Kontain requirement
Origin	Natural sodium; no soda-ash activation
Montmorillonite	>70 wt%
Carbonates	<1 wt%[1]
Particle size	Powder; ≥80% passing 75 µm
Cation exchange capacity	≥70 meq/100 g (cmol/kg)
Unmodified bentonite swell	≥24 mL/2 g; ASTM D5890 in reagent water
Verification frequency	At least every 50 tonnes

[1] BPEM specifies carbonate content as <1–2 wt%; Kontain requires <1 wt%. Mineralogy and origin apply to the natural bentonite before polymer modification.

Match the contact conditions

Select the grade for the subgrade, contact liquids, exposure period and confinement. Assess representative pore water or leachate, including calcium, magnesium, pH and the hydration sequence.

Specify the order

Specify the film grade, roll dimensions, edge arrangements and joint detail when ordering. Retain roll identification and material certificates for construction quality assurance.

Bentonite material criteria form part of the complete liner design and construction quality assurance requirements.

Discuss your project with Kontain

kontainsolutions.com

[1] EPA Victoria, BPEM 788.3 (August 2015), Appendix E. epa.vic.gov.au/sites/default/files/epa/publications/788-3.pdf