



TERRE ARMEE



Landfill Lining



**TerraLine** – GCL  
NEEDLE PUNCHED GEOSYNTHETIC CLAY LINERS

Waterproofing



# TerraLine – GCL

TerraLine - Geosynthetic Clay Liners (GCL) are factory made hydraulic barriers consisting of very low-permeability bentonite powder supported by geotextiles and/or geomembranes. The engineering function of a TerraLine – GCL is containment as a hydraulic barrier to water, leachate or other liquids and sometimes gases.

## Applications

- **Landfill Lining or Capping:** Containment of leachate in construction of landfills (urban, industrial and special solid waste) and reclamation of exhausted landfill sites or contaminated industrial areas.
- **Mining:** Protection from residual during Heap-leaching mining process.
- **Waterproofing:** Used in reservoirs hydraulic works, decorative ponds, recreational lakes, open-cut tunnels, underpasses and secondary containment of petroleum storage tanks & building basements.
- **Ground Water Protection:** Used for water table protection in transport infrastructures (roads, railways, airports).
- **Retaining Structures:** Protection of benches in multi – tier retaining and MSE structures.

## Technical Parameters

Properties	Test Method	Unit	Tolerance	TAL5/310	TAL 3012	TAL 4012	TAL 4512	TAL 5014	TAL 5018	
<b>Geotextile</b>										
<b>Physical Properties</b>										
Cap Non-Woven Mass per Unit Area	ASTM D5261	g/m <sup>2</sup>	10%	200	200	200	200	200	200	
Carrier Woven Mass per Unit Area	ASTM D5261	g/m <sup>2</sup>	10%	110	125	125	125	140	200	
<b>Sodium Bentonite</b>										
<b>Hydraulic Properties</b>										
Montmorillonite Content	XRD Analysis	%	-5	80	85	85	85	85	85	
Swell Index	ASTM D 5890	ml/2g	-1	24	25	25	25	25	25	
Fluid Loss	ASTM D 5891	ml	+1	18	17	17	17	17	17	
<b>Finished GCL (Geosynthetic Barrier Clay)</b>										
<b>Physical Properties</b>										
Bentonite Mass per Unit Area (@12% moisture)	ASTM D 5993	g/m <sup>2</sup>	-2.50%	5000	3000	4000	4500	5000	5000	
Bentonite Mass per Unit Area (@ 0% moisture)	ASTM D 5993	g/m <sup>2</sup>	-2.50%	4460	2640	3520	3960	4400	4400	
GCL Mass per Unit Area (@12% moisture)	ASTM D 5993	g/m <sup>2</sup>	-2.50%	5310	3325	4325	4825	5340	5400	
<b>Mechanical Properties</b>										
Tensile Strength (T <sup>MAX</sup> )	MD <sup>vi</sup>	ASTM D 6768	kN/m	-10%	12	12	12	12	14	18
Tensile Strength (T <sup>MAX</sup> )	CMD <sup>vi</sup>	ASTM D 6768	kN/m	-10%	12	12	12	12	14	18
Strain at Max Load	MD <sup>vi</sup> /CMD <sup>vi</sup>	ASTM D 6768	%	-	<30	<30	<30	<30	<30	<30
Static Puncture Strength (F <sub>p</sub> ) <sup>i</sup>		ASTM D 6241	kN	-10%	2.2	2.2	2.2	2.2	2.4	3.5
Grab Strength	MD <sup>vi</sup>	ASTM D 4632	N	-10%	500	500	500	500	650	1100
Hydrated Internal Shear Strength <sup>viii</sup>	MD <sup>vi</sup>	ASTM D 6243	kPa	-	24	24	24	24	24	24
<b>Hydraulic Properties</b>										
Hydraulic Conductivity (K <sub>20</sub> ) <sup>ii</sup>	ASTM D 5887	m/s	-15%	2 x 10 <sup>-11</sup>	4 x 10 <sup>-11</sup>	2 x 10 <sup>-11</sup>	2 x 10 <sup>-11</sup>	2 x 10 <sup>-11</sup>	2 x 10 <sup>-11</sup>	
Index Flux (qi) <sup>iii</sup>	ASTM D 5887	(m <sup>3</sup> /m <sup>2</sup> )/s	-15%	5 x 10 <sup>-9</sup>	8 x 10 <sup>-9</sup>	5 x 10 <sup>-9</sup>	5 x 10 <sup>-9</sup>	5 x 10 <sup>-9</sup>	5 x 10 <sup>-9</sup>	
<b>Standard Packaging</b>										
Thickness	ASTM D 5199	mm	-10%	7	5	6	6.5	6.5	6.5	
Dimension (H x L) <sup>iv</sup>		m	-	44 x 5	56 x 5.1	48 x 5.1	44 x 5.1	44 x 5.1	44 x 5.1	
Estimated Roll Weight <sup>v</sup>		kg	-	1209	970	1080	1100	1210	1230	

<sup>i</sup> Maximum push-through force

<sup>ii</sup> Coefficient of conductivity at 20 °C

<sup>iii</sup> Value of heat flux

<sup>iv</sup> These values are subject to ±1% variation

<sup>v</sup> Other roll sizes available

<sup>vi</sup> MD- Machine Direction, CMD- Cross Machine Direction

<sup>vii</sup> Peak value measured on 10 cm width specimen

<sup>viii</sup> Peak values measured at 30 kPa normal stress for a hydrated specimen

### NOTES

A. All values are nominal values.

B. These properties may change at the time of handling, storage and shipping.

C. Customized rolls with varying lengths or master rolls can be manufactured.

D. The above values are subject to change as per discretion of the company.