



# Bentotex Geosynthetic Clay Dam Liner

Leaky dams not only waste valuable water but seepage weakens dam walls and can cause them to collapse. To overcome this problem, Bentotex Geosynthetic Clay Liner (GCLs) offers an easy to install, cost-effective way to stop water leaking from dams.

Their low permeability, high internal shear strength and easy installation make Bentotex Geosynthetic Clay Liners ideal for effluent ponds, tailings dams, storage dams, ponds, fish hatcheries, wetlands and irrigation canals. They also prevent embankment seepage from weakening the structure.

Bentotex reinforced Geosynthetic Clay Liners consist of a layer of natural sodium bentonite clay granules sandwiched between two geotextiles. These geotextiles are bonded together through a needle-punching process where fibers are entangled to provide reinforcement. The geotextiles provide long lasting resistance to physical or chemical break-down in harsh environments. Natural sodium bentonite was



formed by the reaction of volcanic ash and salt water millions of years ago. When hydrated under confinement the bentonite granules swell to form a low permeability gel, the equivalent hydraulic protection of several feet of compacted clay. Natural sodium bentonite gives GCL its durability, high-swelling, self-healing and low permeability properties ideal for farm dams.



GCLs have been used in environmental, civil and landfill liner applications for nearly 30 years. They have an unmatched sealing capability and are cheaper to install than compacted clay soil. Rolled out like a carpet and hydrated with water, Bentotex GCL becomes a durable impermeable liner. Its self-healing around holes or punctures means there is less chance of leaks due to installation damage.

## **BENEFITS OF BENTOTEX DAM LINER**

- Reduced construction costs compared to compacted clay;
- High strength geotextile reinforcement gives long term durability;
- GCLs made with bentonite granules have less occupational and safety issues than those made with bentonite dust;
- Uniform peel strength provides multi-directional shear strength;
- Self-sealing overlaps - no specialist joining technique is required;
- Self-sealing attributes, reduces the risk of failure due to adverse field and operating conditions;
- installation advantages with 5m wide rolls and custom roll lengths;
- Easy to apply bentonite granules for edge sealing - no on-site mixing of bentonite powder is required;
- Rigorous testing and quality assurance – the factory is both Branz and CodeMark certified;
- Quick, easy and cost effective to install.

## APPLICATIONS

- Dams and dam wall liners
- Effluent ponds
- Stormwater retention ponds
- Canal Liners

## PACKAGING



Bentotex GCL Dam Liner is normally supplied rolled on 100mm I.D. corrugated HDPE cores 5m wide x 30m long (area 150m<sup>2</sup>). Rolls 5.8m x 35m are also available. The liner can be cut to length or shape, as required. Each roll is packed in a strong waterproof liner to prevent water absorption and loss of rigidity during transportation. Lifting slings can be fitted on request. Bentonite granules and powder is also available.

To calculate the number of rolls required it is a good idea to prepare a diagram showing how the rolls will be laid. Allowing for the slope of the sides of the dam, measure the full length and width from edge to edge. Add an extra 2m to the length and width to allow for burying the ends of the rolls into anchor trenches. Use these measurements and your diagram to calculate the total area. For a normal shaped dam add 7% to allow for side and end overlaps and wastage. To seal the liner, each roll overlaps the adjacent one by a minimum of 300mm. Therefore the effective coverage of each roll is 141m<sup>2</sup> (4.7m x 30m). If the dam is shaped like a water hazard at a golf course, you will need to allow for additional material.

**Dam area (including slopes and anchor trenches) 5,000m<sup>2</sup>**

**Overlaps @7% = 350m<sup>2</sup>**

**Total Quantity required = 5,350m<sup>2</sup>**

**Number of rolls: 5350/150 = 36**

## INSTALLATION

Most Geosynthetic Clay Liners can be installed by construction personnel using conventional earthmoving equipment. In many cases a farm dam can be lined with rolls of GCL using basic farm machinery. There is no specialised equipment required to weld the liner.

Before laying the GCL, the surface must be well prepared. The soil must be firmly compacted and smooth. There should be no abrupt elevation changes, voids, rutting, cracks or standing water. All sharp-edged rocks, stones, sticks and other foreign matter must be removed or covered to at least 12mm.

To prevent the liner sliding down the dam wall GCL panels should be anchored into a trench at the crest of the dam. The panels are then unrolled down the dam face using a backhoe and spreader bar assembly. It is important to seal the overlaps with bentonite clay. Finally 30cm of cover soil is placed over the GCL. Once laid, vehicular traffic should be avoided.



## BENTOTEX TECHNICAL SPECIFICATIONS

	Test Standard	Units	Grade
<b>Natural Sodium Bentonite Granules</b>			<b>GCL-3600</b>
Swell Index	ASTM D-5890	ml/2g	> 24
Fluid Loss	ASTM-D-5891	ml	<18
Moisture Content	ASTM D-4643	%	< 12
Coefficient of water absorption	ASTM D-4643	%	> 600
<b>Geotextiles</b>			
Polyester Cover (non-woven)	ASTM D 5261	g/m <sup>2</sup>	230
Polypropylene Carrier (woven)	ASTM D 5261	g/m <sup>2</sup>	110
<b>Bentoseal Dam Liner (as manufactured)</b>			
Quality Assurance	ISO 9001		Yes
GCL Total Mass	ASTM D-5993	g/m <sup>2</sup>	> 4350
Bentonite Mass @ 0% m.c.	ASTM D-5993	g/m <sup>2</sup>	> 3600
GCL Rupture Intensity Strength	ASTM D-6768	kN/m	> 10
CBR Strength	GB/T 14800-1993	N	> 1400
CBR Elongation	GB/T15788-1995	%	> 10
Peel Strength	ASTM D-6496	N	>60
Hydraulic conductivity k-value (Permeability)	ASTM D-5887	m/s	<5x10 <sup>-11</sup>
<b>Dimensions – can be varied according to customer's requirements</b>			
Width		m	5.0
Length		m	30
Effective Coverage per Roll (5.0m x 30m excluding overlap)		m <sup>2</sup>	150



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