

Model specification 11/09/12

Geocomposite combined drainage and membrane protection system for the side slopes of a landfill cell (for use within the UK)

1.	The Geocomposite has four functions; Drainage, filtration, separation and Protection. The geotextile shall be manufactured under factory production control guidelines set out within EN 13252; Geotextiles and geotextile related products – characteristics required for use in drainage systems and EN 13257; Characteristics required for use in solid waste. The manufacturer must be able to supply accompanying CE documentation upon request. The functional characteristics and relevant test methods to this specific condition of use are identified below:
2	The Geocomposite shall have the following properties:

2.1 Physical Properties:				
Polymer type (geotextile):	Prime quality virgin polypropylene fibre containing 1% carbon black by weight.			
Polymer type (extruded band-drain and filter wrap)	Prime quality virgin polypropylene for both components			
Geocomposite type:	Needlepunched nonwoven fabric manufactured from mechanically entangled staple fibre with surface/integral (<i>delete as appropriate</i>) extruded profile band-drains as 1m/0.5m (<i>delete as appropriate</i>) centres.			
	Approved test method	Units	Typical Mean value	Allowable tolerance to 95% confidence limits
Thickness @ 2kPa:	EN ISO 9863-1: 2005	mm	#	n/a * ^[1]
2.2 Mechanical Properties between drains:				
Static puncture strength (CBR)	EN ISO 12236	kN	#	-10%
Push-through displacement	EN ISO 12236	mm	#	n/a * ^[1]
Tensile strength (md/cmd)	EN ISO 10319	kN/m	#	-10%
Tensile elongation (md/cmd)	EN ISO 10319	%	#	+/-30%
Cone drop perforation hole diameter	BS EN 13433	mm	#	+3mm
Protection Efficiency	EN ISO 13719	kN/m ²	#	-5.10 ³ kN/m ² * ^[2]
2.3 Filtration/Drainage Properties:				
Water flow normal to the plane of the geotextile @50mm head	EN ISO 11058	l/s/m ²	#	-30%
Characteristic opening size: 90% finer [O ₉₀]	EN ISO 12956	µm	#	+/-30 %
In-plane flow capacity @20kPa (i=1)	EN ISO 12958	L/s/m width	#	-20%
@100kPa (i=1)			#	-20%
@200kPa (i=1)			#	-20%
* Indicates property not used for quality control as part of harmonised testing within EN 13252				

2.4 Durability (according to annex B: EN 13253):			
Resistance to weathering (UV) @ 50MJ/m ² radiant exposure	EN 12224	Retained Strength	>80%
Resistance to Oxidation (150 years)	EN 13438	Retained Strength after 84 days	>80%
Microbiological Resistance	EN 12225	Retained Strength	>80%
Resistance to liquids	EN 14030	Retained Strength	>80%
* Durability test data can be supplied by the manufacturer – test frequency must not exceed 3 years.			

3.	The above geocomposite is specified as an initial estimate for use with typical stone as specified in Clause ## of this specification, the geocomposite should be of equivalent mechanical strength to the basal geotextile used within the design. It is a requirement that a cylinder test should be carried out prior to installation of the basal geotextile and stone in accordance with the Environment Agency Standard: A Methodology for Cylinder Testing of Protectors for Geomembranes – April 2006. A report must be provided by a laboratory that is accredited by UKAS to perform this specific test. Laboratory accreditation to ISO 17025 alone is not acceptable. Testing must be performed using site specific aggregate and membrane. For HDPE membrane the maximum allowable strain value shall be 0.25% on any individual indentation.
4.	The geocomposite shall be delivered to site in packaging, which will protect the product from damage during handling, storage. Packaging must be suitable to protect the product from UV degradation. Product must be kept in appropriate packaging until such time that it is required for installation. The geocomposite shall be clearly and indelibly marked with the product name along the edge of the roll at regular intervals no greater than 5m. The labelling shall clearly identify the product supplied in accordance with EN ISO 10320: Geotextile and Geotextile related products – Identification on site.

5.	The geocomposite manufacturer shall provide production test certificates on mechanical properties at the rate of one set of tests per 6,000m ² delivered to site and a minimum of one set per contract. Test methods employed shall be in accordance above specification and the reporting laboratory should be accredited by UKAS to carry out the required tests. Certificates relevant to a batch of geotextile shall be furnished to the Engineer prior to that batch of Geocomposite being incorporated in the works.
6.	The rolls of geocomposite shall be stored on level ground and stacked not more than five rolls high and no other materials shall be stacked on top of the geotextiles.
7.	The geocomposite shall be laid and installed in the positions and to the line and levels described on the drawings. Construction plant must not operate directly on the geotextile. When placing drainage material, delivery and excavation plant shall operate on a minimum layer of 1m of cover.
8.	Joints shall be formed by overlapping by a minimum of 300mm. The contractor should satisfy the Engineer that no particle of cover material can migrate between layers at the overlap. Alternatively the joint may be reduced to a minimum of 100mm and continuously jointed by the use of an approved hot air welding technique.
9.	On site quality control should be performed in accordance with CEN/TR 15019. <ul style="list-style-type: none"> - Test specimens should be taken every 6,000 m², with a minimum of 1 test above 1000 m² - For sampling EN 963 should be applied, i.e. samples should be taken not less than 5m from the end of the roll in machine direction and over the whole width in the cross machine direction. The location of the sample should be described exactly. For evaluation of conformance, statistical procedure should be used in line with section 5.2 of CEN/TR 15019: 2004.
10.	The following definitions shall apply when considering test results: <ul style="list-style-type: none"> • A <i>set of test results</i> shall be those results derived from specimens cut from one sample. • The <i>mean value</i> for any set of test results shall be the arithmetic mean of that set of results. The <i>characteristic value</i> is the value below which not more than 5% of the test results may be expected to fall. This represents the value at 1.645 standard deviations below the mean value

A typical geocomposite which will meet this specification is a Protexia GPT# as manufactured by:

GEOfabrics Limited, Skelton Grange Rd, Stourton, Leeds LS10 1 RD, United Kingdom.
Tel: 0113 202 5678, Fax: 0113 202 5655, E-mail: info@geofabrics.com

Enter the appropriate figures from the product's data sheet in the **Typical value** column.

Protexia GPT data is available in hard copy format or pdf. (e-mail info@geofabrics.com or ring 0113 202 5678 to request a copy). Alternatively, it can be downloaded in pdf format from www.geofabrics.com.

Note: This model specification has been written by senior staff at GEOfabrics Limited who have accumulated over 50 years of experience in landfill applications. The specification does not name a specific product but advocates a high-performance, quality-assured material to be used as a key component of a landfill cell.