

Geotextile to be used beneath a geomembrane used to line a lagoon, lake, ponds or reservoir

1.	The function of the Geotextile is protection between the membrane liner and the subgrade. The geotextile shall be manufactured under factory production control guidelines set out within EN 13254; Geotextiles and geotextile related products – characteristics required for use the construction of reservoirs and dams. 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 geotextile shall have the following properties:

2.1 Physical Properties:				
Polymer type:	Prime quality virgin polypropylene fibre containing 1% carbon black by weight.			
Geotextile type:	Needlepunched non-woven fabric manufactured from mechanically entangled staple fibre.			
	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:				
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
Austrian pyramid puncture	EN 14574	N	#	-20%
<small>*[1] Indicates property not used for quality control as part of harmonised testing within EN 13254.</small>				

2.3 Durability (according to annex B: EN 13253):			
Resistance to weathering (UV) @ 50MJ/m2 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%
<small>* Durability test data can be supplied by the manufacturer – test frequency must not exceed 3 years.</small>			

3.	Geotextiles 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 geotextile 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.
4.	The geotextile 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 Geotextile being incorporated in the works.
5.	The rolls of geotextile 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.
6.	The geotextile 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 cover material, delivery and excavation plant shall operate on a minimum layer of 1m of cover.
7.	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.
8.	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 30,000 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.
9.	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

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

GEOfabrics' product data sheets are available in hard copy format (e-mail info@geofabrics.com or ring 0113 202 5678 to request a copy). Alternatively, they can be downloaded in pdf format from www.geofabrics.com.

Guidance notes for geotextile selection: consideration should be given to;

The required design life. An irrigation reservoir may only be required to have a short life eg five to ten years whereas an ornamental lake may have an expected life of over fifty years.

The condition of the subgrade. A smooth subgrade with no protrusions or surface stones has less damage potential to the geomembrane than a rough subgrade with protruding stones.

For a short life in light duty conditions a non woven needlepunched geotextile with a CBR of 3kN (HPS3) may be considered adequate.

For a long life in aggressive conditions a much higher grade with a CBR of 6kN (HPS6) to 9kN (HPS9) should be considered. The final decision has to be at the discretion of the designer.