

Energy Sector Lining Systems: Padtex Guidance Manual

protexia[®]
GEOCOMPOSITES

GEOfabrics[®]



Mechanical Strength

Quality

Construction Cost Savings

High Performance

Easy Installation

Environmental Protection

About Us

GEOfabrics Limited is a UK manufacturing company established in 1992. From the outset the objective has been to manufacture high-performance products tailored for use within the demanding environment of a global energy sector.

The company's ethos is to continually exceed the expectations of both existing and future customers with innovative and effective products supported by an established technical service. Successful product development is achieved by understanding the customer's problem, determining the necessary properties and functions that are

required, manufacturing the solution and then rigorous quality testing to demonstrate that the product meets those requirements. GEOfabrics has a dedicated and experienced team of personnel that cover both commercial and technical departments and that work in unison to provide the necessary attributes to meet our global challenges.



GEOfabrics PADTEX

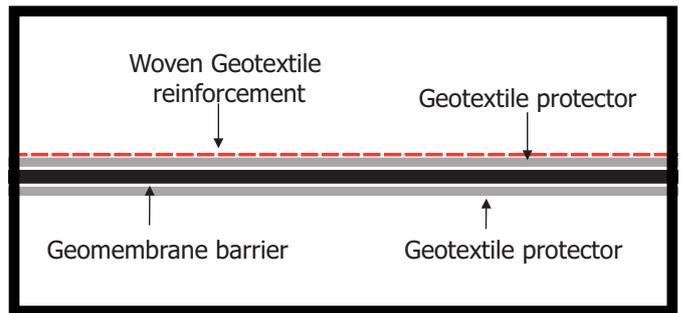
GEOfabrics PADTEX is a high performance geocomposite material, which functions as a barrier and containment system in applications where oil or contaminant spillage is of key concern.



▲ Padtex incorporates high performance HPS geotextiles for maximum resistance to damage.

The system also provides additional reinforcement and protection from damage during robust installations and during service life, on projects where high levels of mechanical performance are required, as part of the lining system.

Performance is provided by a 0.2mm thick geomembrane protected on both sides by a high performance protection geotextile and a reinforcement woven component all manufactured in the form of a multifunctional 4-layer geocomposite, which can be installed in one quick phase as an 'all in one' solution.



▲ Padtex cross section demonstrating the individual components.



▲ A full scale Padtex installation on a typical fracking pad.

Product Benefits

- Range of grades – project specific according to strength required. Padtex 3, Padtex 5 etc.
- Environmental containment – no leakages.
- Absorbent properties – captures accidental spills.
- Anti slippage – high friction levels.
- Long term durability.
- Performance benefits over standard industry options.
- Value engineering and cost savings.

Installation Guidance



▲ Typical Padtex edge detail utilising polymer extrusion weld.



▲ Bonds quickly and easily at roll edges using standard wedge welding equipment.

Installation Benefits

- Wide roll widths up to 16.4ft (5m) – reduced laps and waste.
- Increased speed of installation – one process for multiple layers.
- Consistency of material – from a reliable manufacturer, quality controlled in an accredited laboratory.
- Incorporates a reinforcement layer for extra strength – extremely robust during installation and service life.

Installation Details

- Welded easily and quickly using a small wedge welder set at 200°C.
- Requires a weldable overlap of approximately 100mm.
- It is feasible to laminate through the complete composite (geotextile to geotextile surfaces with membrane between). This welds through the polypropylene geotextile but laminates the membrane effectively.
- Extrusion joints can be utilised on the pad perimeter with polymer, sealing the system at the edges of the installation.



▲ Completed Padtex installation ready for use.

Quality and Performance

Padtex is a 'tailor engineered' unique system, which combines a range of geosynthetic components in a multifunctional composite, developed specifically for gas and oil pad applications.

The product is designed to function as a containment lining system combining a ground reinforcement layer, a containment barrier and protection and filtration geotextiles, in an 'all in one' solution.

Key Mechanical Properties

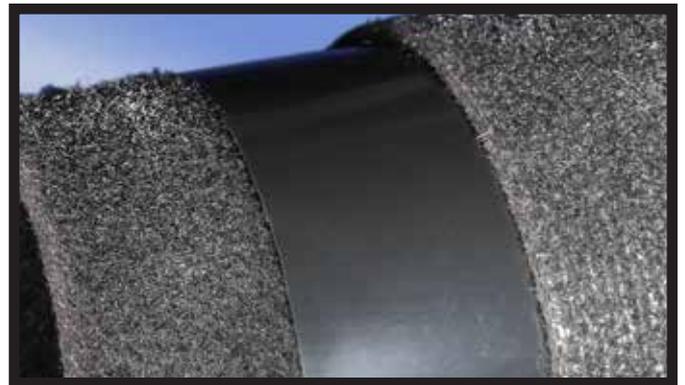
- Thickness – 'point load' adsorption from sharp equipment or angular material.
- CBR (California Bearing Ratio) – resistance to static puncture e.g. standing structures.
- Cone drop – dynamic puncture resistance from moving plant, dropped equipment, pipes etc.
- Tensile strength provides high levels of reinforcement, and improves ground bearing capacity.
- Elongation – ability to stretch without failure.
- Shear strength – high bond strength minimises the risk of delamination and ensures product integrity and stability on slopes.

Key Hydraulic Properties

- Pore size – ability to contain fines, dust, soils etc. The geotextile will trap particles.
- Permeability – extremely low (typical 1×10^{-7})
- Water flow – contains impermeable barrier lining system. The geotextile will adsorb spillages.

Key Chemical Properties

- Long term durability – between 5 - 25 years, depending on ground conditions (normal soils >4 pH <9).
- UV resistance – 1% carbon black $>90\%$ strength after 6 months in standard operational conditions.
- Microbiological resistance $>90\%$.
- Chemical resistance $>90\%$.
- Plastic polymers – considered chemically/biologically inert.



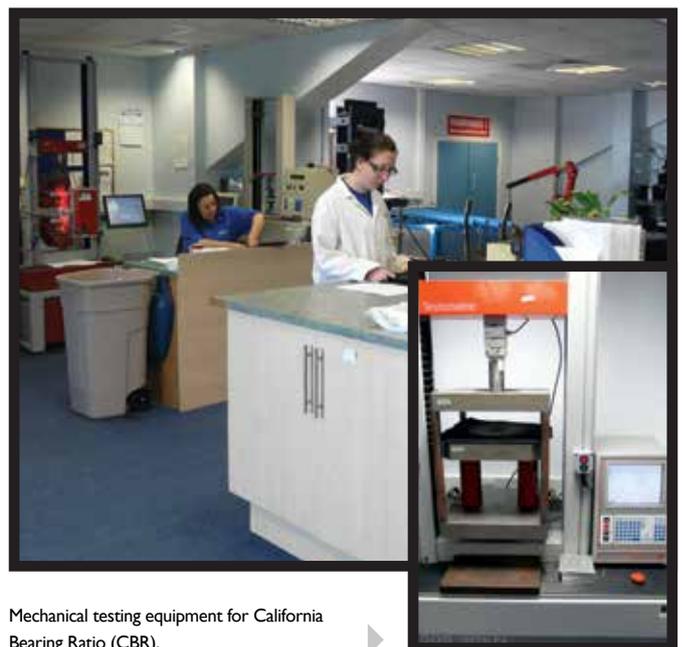
▲ Each Padtex component is carefully selected to provide a specific engineering function to meet long term performance requirements.

Quality and Development

Geofabrics continue as one of the main geosynthetic innovators in the industry with our highly active Research and Development department. Our continued success in new products is as a result of an experienced team and our ongoing relationships with an expanding list of professional clients who partner with us to produce bespoke geosynthetic solutions.

GEOfabrics' priority is to manufacture a high quality end product that provides the exact needs of our customers, in line with function, durability, value and in accordance with all current legislation and design standards.

GEOfabrics has an extensive laboratory and test facilities. We have a wide range of UKAS accredited tests used for quality control and research and development. ▶



Mechanical testing equipment for California Bearing Ratio (CBR). ▶

Technical Specification

GEOfabrics' Padtex environmental lining systems provide a range of high performance mechanical and hydraulic properties, detailed in the following product specification.

Property	Method	Units	Product Value
Geosynthetic Barrier Data			
Polymer	Linear low density polyethylene (LLDPE)		
Thickness		mils	7.9
Unit Mass		g/m ²	187.5
Nonwoven Protection Geotextile Data			
Fibre Type	High tenacity virgin polypropylene staple containing 1% carbon black UV inhibitor		
Static Puncture Strength (CBR)	BS EN ISO 12236	lb	674
Tensile strength (md/cmd)	BS EN ISO 10319	lb/ft	418/418
Dynamic Perforation Test	BS EN ISO 13433	mils	236
Reinforcement Woven Geotextile Data			
Static Puncture Strength (CBR)	BS EN ISO 12236	lb	719
Tensile strength (warp/weft)	BS EN ISO 10319	lb/ft	543/543
Dynamic Perforation Test	BS EN ISO 13433	mils	472
Composite Data			
Static Puncture Strength (CBR)	BS EN ISO 12236	lb	1461
Tensile strength (md)	BS EN ISO 10319	lb/ft	627
Tensile strength (cmd)	BS EN ISO 10319	lb/ft	835
Dynamic Perforation Test	BS EN ISO 13433	mils	118
Thickness	BS EN 9863:1	mils	224
Physical Properties			
Roll Dimensions		ft	16.4 x 328
Approximate Roll Diameter		ft	2.8
Approximate Roll Weight		kg	570

Values are typical, with the exception of thickness, which is nominal. Typical indicates the mean value derived from the samples taken for any one test as defined in the BS EN ISO standard - usually the mean of five samples. Nominal is a guide value.

All GEOfabrics composite products are tested in independently-audited ISO 17025 UKAS-accredited laboratories for all mechanical, hydraulic and performance related properties at a minimum of one set every 6000m².

GEOfabrics Limited supply a world class range of engineering products for a diverse set of applications, across the UK and international markets. We pride ourselves on building strong, long-term and mutually beneficial partnerships with our agents and distributors, in order to provide a quality technical supply service to our clients.

USA

CANADA

UK

EUROPE

AFRICA

ASIA



Further literature,
in the form of case studies,
design guides, installation
procedures, product
data sheets and model
specifications **can be**
downloaded from
www.geofabrics.com

GEOfabrics Limited
Skelton Grange Road
Stourton
Leeds
LS10 1RZ
United Kingdom

Tel: +44 (0) 113 202 5678
Fax: +44 (0) 113 202 5655

Email: info@geofabrics.com
Web: www.geofabrics.com



International distribution
USA CANADA