TENCATE

CORPORATE CAPABILITIES

The Difference We Make

TENCATE GEOSYNTHETICS

THE WORLD LEADER IN GEOSYNTHETICS

TenCate Geosynthetics has more than 60 years of global leadership being at the forefront of the growth and development of geosynthetics and its applications in civil and environmental engineering. TenCate's manufacturing facilities are located across The United States, Europe and Asia with an extensive global distribution network to serve the rapid infrastructure growth and rising demand for geosynthetics worldwide. Within these infrastructure markets are solutions for engineered structures, erosion control, drainage and filtration, road and railway transportation, pavement rehabilitation, marine structures, inland waterways protection and environmental dewatering.

ADVANCED APPLICATION KNOWLEDGE, EXPERIENCE & TECHNOLOGY

TenCate Geosynthetics continues to serve the geosynthetics industry with expert application knowledge, the highest quality solutions and products with reputable global brands that adhere to strict international quality standards. Modern design guidelines and performance oriented specifications are incorporated by TenCate's team of experts to provide maximum value and progressive engineered geosynthetics solutions for the most complex of engineering problems. Award-winning projects and an extensive project history is a testament of TenCate's experience, expertise and capabilities, setting the standard as the foremost leader in the industry.

Our focus market segments are:

STRONG BRANDS

TENCATE Polyfelt®

TenCate Polyfelt®, a renowned trademark for more than 30 years, encompasses a wide range of nonwovens and composites combined with nonwoven elements for various market infrastructures.

TENCATE Mirafi®

Established in the early 1970s, TenCate Mirafi® represents a family of high performance woven geotextiles for soil reinforcement and heavy duty stabilization applications.

TENCATE Miragrid®

Developed in the late 1980s and first trademarked in 1992 by Mirafi, Inc., TenCate Miragrid® geogrids have since been used around the world for soil reinforcement applications.

TENCATE Geotube®

TenCate is the pioneer of Geotube® technology. Since the North Sea Flood in 1953, TenCate Geotube® now covers the globe with engineered containment systems designed for water infrastructures and environmental dewatering.

OUR VISION

To be the leading global provider of geosynthetic products and solutions that enhance the world's infrastructure, protect the environment and conserve natural resources.

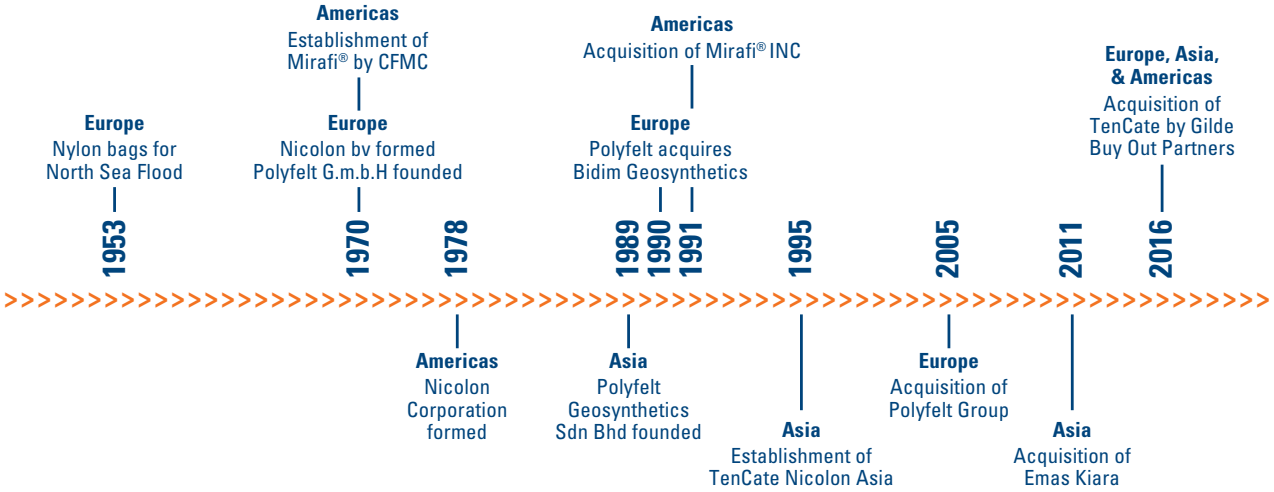
OUR HISTORY

The North Sea Flood of 1953 launched TenCate's quest for innovative product development. This catastrophic flood destroyed the coast of The Netherlands, leaving in its wake nearly 2,000 dead. With a strong will to survive, the Dutch immediately began work on a new generation of dike protection that would be strong enough to withstand nature's harshest forces. The search ended at Nicolon B.V. of Holland, a company dedicated to creating stronger, more advanced industrial textiles.

Over time, as the use of geosynthetics developed worldwide, TenCate has remained at the forefront of this expansion in geosynthetics usage. In Europe and in the Americas, TenCate's history began in the late 1960's. In Asia, Polyfelt Geosynthetics Sdn Bhd was founded in Malaysia in the late 1980's, pioneering the market of nonwoven geotextiles. TenCate Nicolon Asia was formed in 1996 to also focus on the fast growing geosynthetics opportunities in Asia. TenCate Geosynthetics acquired the Polyfelt Group in 2005 to form TenCate Geosynthetics Asia with its headquarters in Kuala Lumpur, Malaysia.

Plans for expansion and a wider market coverage for geosynthetics and industrial fabrics continued with the construction of a production plant in Zhuhai, China through the establishment of Ten Cate Industrial Zhuhai Co, Ltd.

With the rapid growth in infrastructure, environmental and water management applications in the Asian region, TenCate acquired the geosynthetics business of Emas Kiara Industries Bhd, a public listed manufacturer based in Malaysia in 2011. The acquisition further strengthened TenCate Geosynthetics' leading market position in Asia with a significantly larger capacity and wider range of geosynthetics solutions for Asian markets.



ENSURING A PROGRESSIVE IMPROVEMENT IN GEOSYNTHETIC QUALITY STANDARDS

UNCOMPROMISED QUALITY

TenCate Geosynthetics' products are manufactured to strict international quality standards. All products are tested and verified at our specialized laboratories which are accredited under numerous standards and certifications. We offer our partners a service covering the full range scope of data tests according to modern standards of testing to ensure products delivered to site meet specified quality requirements.

ISO/IEC 17025 ACCREDITED LABORATORY TEST FACILITIES

Geosynthetic Testing laboratory (GTL), an independent division of TenCate Geosynthetics Asia, has the distinction of being the first specialist geosynthetic laboratory in Asia accredited under ISO/IEC 17025 by Department of Standards Malaysia (Standards Malaysia), Laboratory Accreditation Scheme Malaysia (SAMM) and the Geosynthetic Accreditation Institute (USA) - Laboratory Accreditation Program (GAI-LAP). GTL offers engineers a testing service covering a full scope of geosynthetic tests according to current ISO, ASTM and EN (European Norm) standards to assure products delivered to site meet specified quality standards.

FULL SCALE TESTING AND SITE SAMPLING SERVICE

GTL is unique among Asian geosynthetic laboratories in that it is the only laboratory with a supporting test unit designed to facilitate large scale testing of geosynthetics performance under actual site conditions. As a service to the construction industry GTL offers an on-site quality assurance service including site inspection, sampling and preconditioning of extracted samples. Engineers are invited to witness testing. The results of all tests are reported in a full and objective manner, in full accordance with the requirements of the test norm, to allow engineers to assess the overall quality of products tested.

INTERNATIONAL RECOGNITION

Accreditation is defined as the formal recognition that a testing laboratory is competent to carry out specific tests which are individually accredited. GTL is a SAMM and GAI-LAP accredited laboratory.

GEOSYNTHETIC TESTING AVAILABLE AT GTL

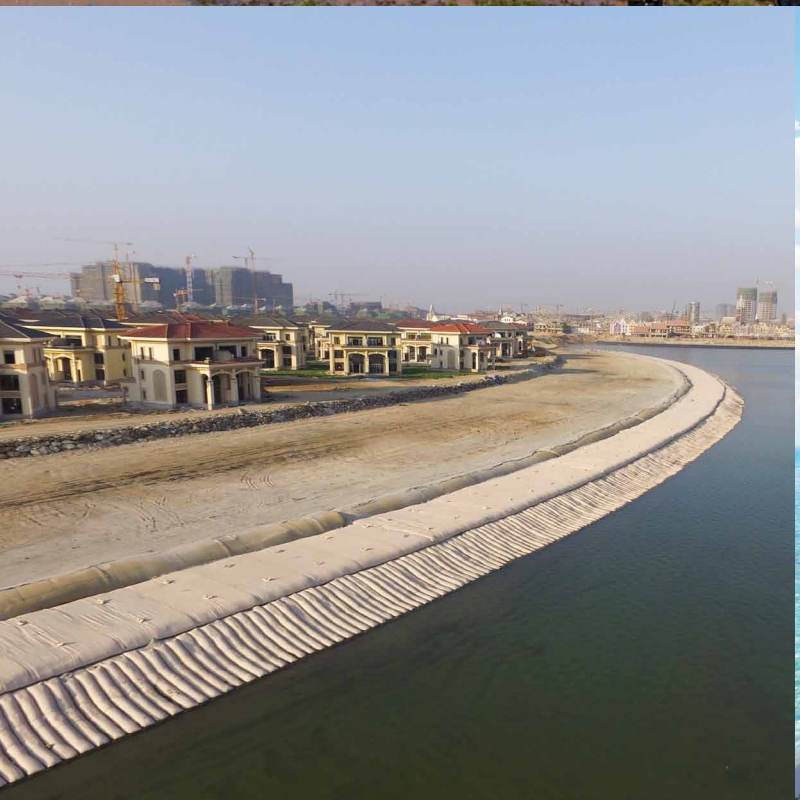
Property	Test Standard			Relevance to civil and environmental engineering works					
	ISO	ASTM	GRI						
Geotextile									
Mass per unit area	9864	D5261							
Thickness @ 2kPa	9863	D5199							
Wide width tensile strength & elongation	10319	D4595		•	•	•	•	•	•
CBR static puncture	12236	D6241		•	•	•		•	•
Drop cone (dynamic)	13433			•		•		•	
Grab breaking load and elongation		D4632							
Trapezoid tear strength		D4533							
Seam strength	10321	D4884		•		•		•	
Opening size	12956	D4751		•		•			
Permeability normal to plane (permittivity)	11058	D4491		•		•			
Water flow in the plane (transmissivity)	12958	D4716			•			•	
Geogrid									
Tensile strength and elongation	10319	D6637	GG-1		•				
Junction strength		D7737	GG-2						
Geomembrane									
Index puncture resistance (rod puncture)		D4833						•	

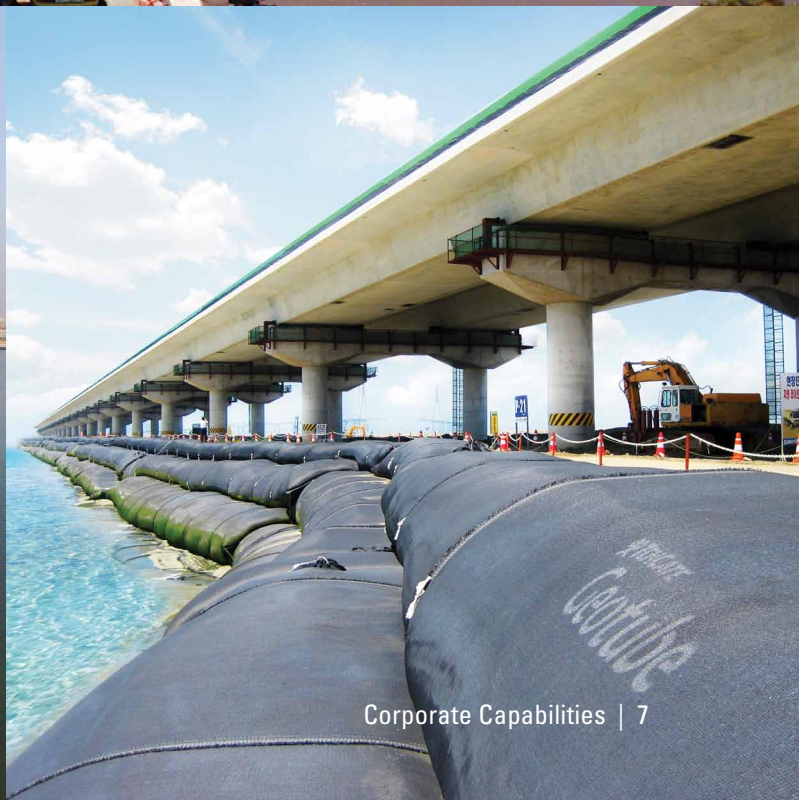
- Road /earthwork structures & subgrade stabilization
- Surface erosion control
- Reinforced walls / slopes & base embankment
- Waste landfills / tunnels
- Coastal and riverbank erosion protection
- Road pavement rehabilitation

ISO - International Organization for Standardization
ASTM - American Society for Testing & Materials
GRI - Geosynthetic Research Institute (Drexel, USA)

MAKING A DIFFERENCE

The market challenges us to continue delivering the most comprehensive line of geosynthetics and industrial fabrics in the world. We accept that challenge by helping our customers achieve tangible results with cost-effective and innovative solutions. No problem is too complicated and no location is too remote for TenCate. We have the capability and capacity to supply products to fast-paced projects within tight schedules in diverse locations. Our project history and award winning projects are a testament to this capability. This fortifies our belief in the power of geosynthetic and industrial fabric solutions. It also strengthens our resolve to make geosynthetics make a difference around the world.




Geotube

TENCATE GEOSYNTHETICS SOLUTIONS

TenCate Geosynthetics deliver solutions that enhance a wide range of applications in civil and environmental engineering.


BASAL REINFORCEMENT


DRAINAGE / FILTRATION


SUBGRADE STABILIZATION


REINFORCED WALLS AND SLOPES


FOUNDATION CONSOLIDATION


PAVEMENT REHABILITATION


MARINE STRUCTURES


WATERWAYS & IMPOUNDMENTS


TURBIDITY CONTROL


DEWATERING


POND CAPPING


EROSION CONTROL


LINER PROTECTION

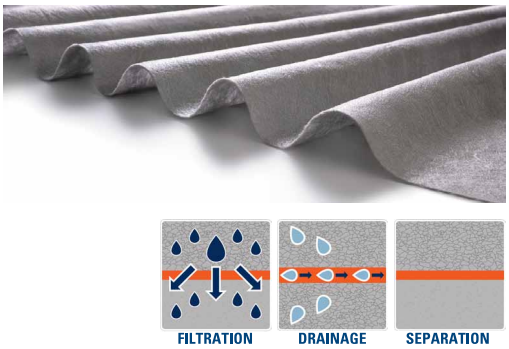

LINING


VENEER REINFORCEMENT

TENCATE GEOSYNTHETICS PRODUCTS

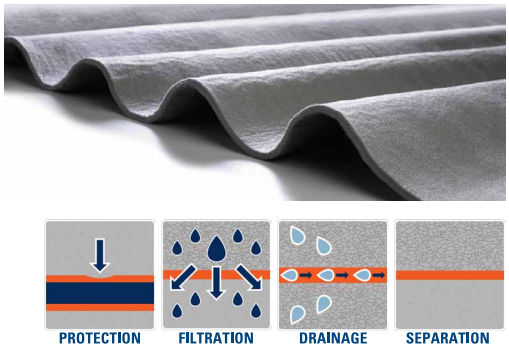
NONWOVEN GEOTEXTILES

TenCate Polyfelt® TS & KET nonwoven geotextiles are mechanically robust and highly durable with optimum water permeability and soil filtration characteristics. The nonwoven geotextiles are UV stabilized to prevent quick degradation from sun exposure and is commonly applied as a separator to stabilize fill over soft subgrades, revetment filtration in hydraulic and marine applications and as a subsoil filter.



APPLICATION :
Separator over soft subgrade, subsoil filter and revetment filtration

TenCate Polyfelt® Heavy Duty TS & KE nonwoven geotextiles offer maximum static and dynamic puncture protection and drainage. These range of heavy duty nonwoven geotextiles also function as a separation and filter geotextile.



APPLICATION :
Separator over soft subgrade, subsoil filter and revetment filtration

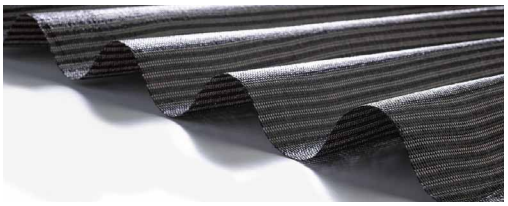
TenCate Polyfelt® F anti-clogging filtration engineering geotextiles are made from a mechanically bonded double-layered nonwoven continuous filament 100% UV stabilized polypropylene. The double-layer matrix of nonwoven geotextile offers optimum opening size and high water permeability to minimize internal clogging in the geotextile and high installation damage.

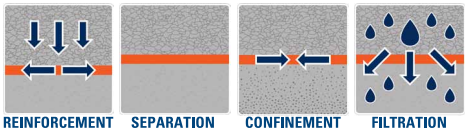
APPLICATION :
Hydraulic filtration

TENCATE GEOSYNTHETICS PRODUCTS

WOVEN GEOTEXTILES

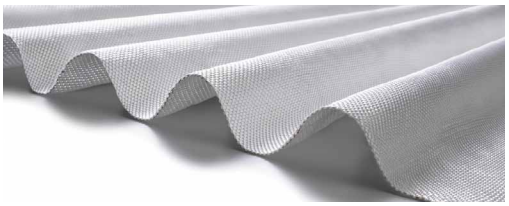
TenCate Mirafi® HPa is a specially developed class of woven geotextile that combines all the critical performance functions such as separation, reinforcement, aggregate confinement and permeability for optimum subgrade stabilization of roadway systems. It is also commonly applied in the construction of load supporting platforms over very soft and wet unstable soils.

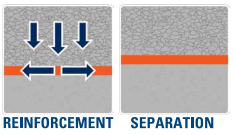




APPLICATION :
Subgrade stabilization

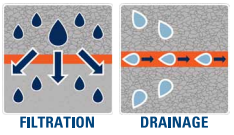
TenCate Mirafi® PET high strength woven geotextiles are made from high tenacity polyester yarns with long term high strength reinforcement properties ideal for basal reinforcement applications on soft soils, piles and over cavities. A cost effective solution that offers greater and quicker stability of embankments constructed on soft foundations.





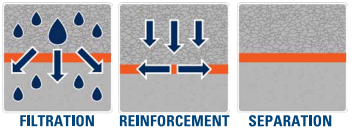
APPLICATION :
Basal reinforcement

TenCate Mirafi® FW is a high performance polypropylene woven geotextiles with high UV resistance designed to perform optimum filtration functions in waste landfill engineering for leachate filtration and landfill cover systems. For landfill cover systems, Mirafi® FW geotextiles allow infiltrating surface water to pass through and prevent fines from clogging the drainage system, thus minimizing water getting into the landfill.



APPLICATION :
Waste landfill engineering

TenCate Mirafi® PP series are woven fabrics, made of fibrillated polypropylene yarns, developed and manufactured mainly for the usage as separation and reinforcement geosynthetics in road constructions. They are also available with woven-in loops and additives for durability in underwater applications.



APPLICATION :
Road construction and pond capping

TENCATE GEOSYNTHETICS PRODUCTS

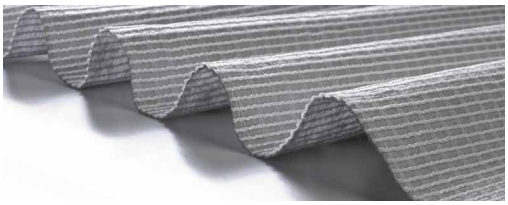
GEOGRIDS

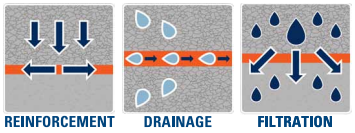
TenCate Miragrid® GX products are knitted geogrids made from polymer coated high tenacity polyester yarns with a flexible structure that ensures high interlocking mechanism and high soil interaction. It offers high tensile strength with low creep characteristics, high chemical, biological and construction damage resistance. A full range of tensile strengths is available.

APPLICATION :
Reinforced walls and slopes

GEOCOMPOSITES

TenCate Polyfelt® PEC geocomposites are made from high tenacity polyester yarns and nonwoven geotextiles combining reinforcement with superior filtration and drainage functionality to enable finer – grained soils to be reinforced. Its high strength reinforcement properties and excellent in-plane drainage capabilities reduce pore water pressure and increases structural stability.





APPLICATION :
Reinforced walls and slopes

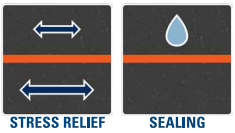
TenCate Enviromat® Geosynthetic Clay Liner (GCL) is an internally reinforced 3-layer polypropylene composite with premium grade sodium bentonite to provide high shear strength and consistent low hydraulic conductivity, a critical performance criteria for GCL's as an effective barrier against liquid migration and gases.

APPLICATION :
Landfill engineering and linings

TENCATE GEOSYNTHETICS PRODUCTS

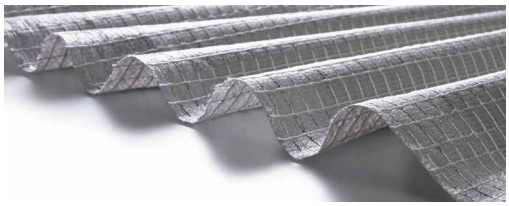
PAVEMENT SOLUTIONS

TenCate Polyfelt® PGM paving fabric is a mechanically bonded continuous-filament polypropylene nonwoven with optimum bitumen retention capacity. Polyfelt® PGM is economically more effective than conventional road maintenance methods. It retards reflective cracking of road surfaces by a combination of stress relief and sealing functions, and uniform bonding between the layers.



APPLICATION :
Road maintenance

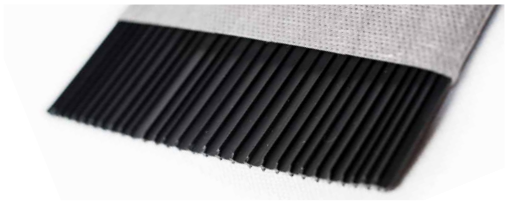
TenCate Polyfelt® PGM-G is a high tensile stiffness glass filament reinforced geocomposite. Polyfelt® PGM-G is ideally suited to the maintenance of any major pavement structures. Its superior reinforcement is designed for heavily trafficked and stressed pavements.

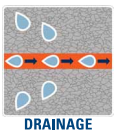


APPLICATION :
Road maintenance

DRAINAGE SOLUTIONS

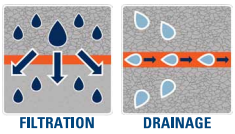
TenCate Alidrain® prefabricated vertical drains (PVD) comprises a synthetic drainage core wrapped with a durable fabric of excellent filtration properties for accelerated consolidation of soft soil. Accelerated consolidation removes excess pore pressures quickly from soft foundation soil increasing the foundation shear strength to support embankment and fill loadings.





APPLICATION :
Accelerated soft soil consolidation

TenCate Polyfelt® DN are geonets made from high density polyethylene (HDPE) to form three-dimensional channels that provide high flow in-plane drainage capacity. **TenCate Polyfelt® DC** is a drainage composite of HDPE geonet bonded with nonwoven geotextiles on one or both sides of the geonet offering a combination of both drainage and filtration functions.

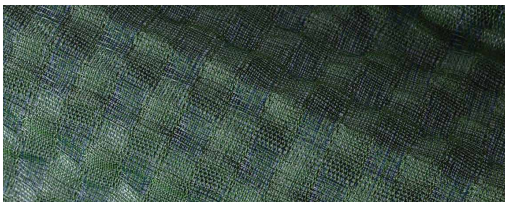


APPLICATION :
Drainage

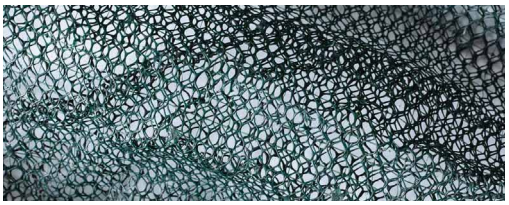
TENCATE GEOSYNTHETICS PRODUCTS

EROSION CONTROL

TenCate Polyfelt® TM13C is a 3D high performance turf reinforcement mat (HPTRM) with outstanding biaxial strength and excellent UV resistance for extended exposure. It offers superior erosion protection performance from the initial stages of installation until vegetation is established. Ideal for very steep slopes, stormwater channels, flow channels above standard flow water level as well as wave runup and overtopping rundown.



TenCate Polyfelt® Polymat EM is a 3D turf reinforcement mat with nominal biaxial strength and good UV resistance for standard exposure duration. It is suitable for gentle to moderately sloping fill slopes.

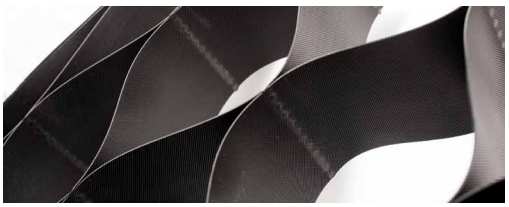


TenCate Polyfelt® Envirofelt offers a range of natural fibre mats for surface erosion protection. **Envirofelt CF** is a 100% biodegradable mat made from natural fibres which stimulates grass and vegetation growth to prevent erosion of topsoil.

Envirofelt CTRM is a natural fibre mat reinforced with polypropylene mesh to provide better reinforcement to steeper slopes whilst facilitating grass and vegetation growth for erosion protection.

APPLICATION :
Slope surface erosion protection

TenCate Polyfelt® Envirocell® is a high performance geocell made from inert polyethylene and ultrasonically bonded to form a three-dimensional cellular confinement system for effective slope surficial erosion control. The interconnected cellular structure provides lateral confinement of various infill materials such as soil, granular material and concrete. **Envirocell®** can also be used as a facing system for steep retaining structures, lining river channels and bridge piers that are at high risk to soil erosion.



APPLICATION :
Slope surface erosion protection

TENCATE GEOSYNTHETICS PRODUCTS

GEOTUBE® SYSTEMS

TenCate Geotube® systems are highly effective solutions for coastal and marine construction such as shoreline erosion protection, land reclamation, construction platforms, revetments, dykes, groynes and offshore structures. The systems are fabricated into close-ended tubular containers using specially engineered woven and composite fabrics to meet varying tensile strength, durability and environmental requirements.

TenCate Geocontainer® units are specially designed containment systems that fit the size of the barge and are pre-filled before being placed in the water. The containers are ideal for underwater structures such as dykes and breakwaters for coastal protection and infrastructures of ports and harbours.

TenCate Geotube® Geobags are versatile and highly robust engineered containers used to protect coastal and inland waterways from erosion. The material of the geobag containers can consist of either an engineered woven or a composite fabric depending on the application requirements and are combined with high capacity seams to produce pillow or box shaped containers.

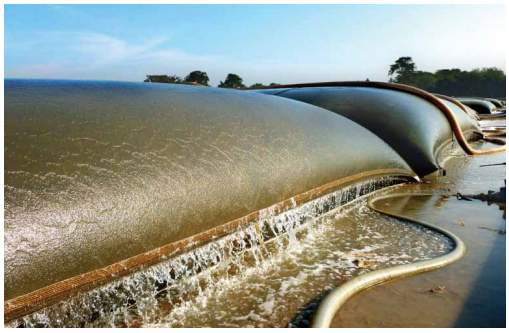
TenCate Geotube® Sand Filled Mattress is a containment product manufactured from two layers of engineered fabrics stitched together at regular intervals. The composite provides excellent abrasion resistance and durability, capable of trapping settling sediments to aide in establishing vegetation. It is ideal for revetments along riverbanks, channel slopes and other waterway sections and impoundment slopes for erosion protection.

TENCATE GEOSYNTHETICS PRODUCTS

TenCate Geotube® Silt Curtains are made of special grade high strength geotextiles with excellent water permeability that is effective in turbidity control and confining sediments within the silt curtain barrier to maintain safety and environmental practices. It is a custom-designed prefabricated system complete with accessories.

TenCate Mirafi® FM woven filter geotextiles are specially engineered filter geotextiles that provide robustness, UV protection and high durability in marine and hydraulic applications. Mirafi® FM is manufactured with strong in-woven loops at intervals to facilitate the fabrication of fascine mattress for easy launch and installation.

TenCate Geotube® Dewatering containers offer efficient and environmental friendly solutions for sludge dewatering in mining and mineral processing, industrial wastewater processing, industrial dredging, agriculture and municipal applications. TenCate Dewatering technology applies specially engineered textiles that are fabricated into permeable containers to optimize solids retention, high effluent discharge rate and filtrate quality.



Geosynthetics Solutions for Engineering Structures

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