GEOSYNTHETICS

TENCATE
Mirafi®

Engineered Structures

Permanent & Temporary Retaining Walls
Reinforced Soil Slopes
Reinforced Embankments
Sludge Pond Enclosures

Protective Fabrics
Space Composites
Aerospace Composites
Advanced Armour

Geosynthetics
Industrial Fabrics
Grass

TENCATE™
materials that make a difference

Did You Know?

The 242’ slope at Yeager Airport in Charleston, WV is the tallest geosynthetic reinforced 1H:1V slope in North America.

Cherry Island Landfill is one of the largest vertical expansion berms in North America, measuring over 65’ tall and almost a mile long. The reinforced berm utilizes high-strength geotextile material with a tensile strength of over 80,000 lb/ft.

The geosynthetic reinforced buttress to repair the 17 acre landslide at Trump National Golf Course in Los Angeles County, is the tallest geosynthetic reinforced wall structure, measuring over 110’ tall.

Soil reinforcement applications have specific needs and objectives. No one understands that better than TenCate Geosynthetics.

Developed to increase performance, reduce costs, and enable engineers to achieve what was once unachievable, TenCate Geosynthetics address the demands of both large-scale commercial sites as well as smaller residential projects. Our high strength geotextiles and geogrids are solutions to such problems as soft ground construction, maximizing useable land for site development, vertical grade separation, and soil structures.

Through engineering and research that spans more than 50 years, TenCate Geosynthetics continues to lead the way in geosynthetic system solutions for reinforced engineered structures. Using our deep knowledge of materials and production methods, combined with a resourceful, hands-on approach, TenCate Geosynthetics delivers materials that make a tangible difference in our customer's businesses. Our products enable walls, reinforced soil slopes, and embankments to be constructed cost-effectively and quickly.

Regardless of the project type, the soil being reinforced, or the design life of the structure, TenCate delivers the materials that solve your construction challenges.

TenCate Geosynthetics Engineered Structures

Geosynthetic Wrap Faced Walls

Cost effective solution for permanent and temporary retaining walls.

Retaining Walls

Geosynthetic reinforced retaining walls are the most cost effective solution for vertical grade structures.

Sludge Pond Caps

High strength geotextiles seamed together provide cost effective, easy to construct solutions for sludge pond enclosures.

Reinforced Steepened Slopes

Geosynthetic reinforcement provides cost effective solutions for 2H:1V slopes, 1H:1V slopes and steeper.

Embankments on Soft Ground

A single layer of high stength geotextiles provides a better solution for multiple layers of lower strength reinforcement.

Load Transfer Platforms for Pile Supported Embankments

When settlement must be controlled, high strength geotextiles provide economical solutions for embankment construction on soft ground.

Void Bridging

High strength geotextiles can provide solutions for subsidence and soil void development.

TenCate Mirafi® geosynthetics (i.e., geogrids and geotextiles) MSE system solutions cost significantly less than conventional structures, and the rapid, simple installation process greatly shortens construction schedules. Their flexibility allows them to be used in both large industrial and small residential applications, with a proven performance in walls, slopes, and embankments.

We use our extensive knowledge of geosynthetics and MSE system solutions to make a difference in your business. How? By creating materials that allow your MSE systems to be constructed more efficiently and effectively.

		Miragrid® XT Geogrids	Mirafi® PET-Series	Miramesh®	Functions
	Block Face Retaining Walls	✓			SOIL REINFORCEMENT
	Green Face Retaining Walls	✓		✓	SOIL REINFORCEMENT; EROSION PROTECTION
	Temporary Retaining Walls	✓		✓	SOIL REINFORCEMENT; EROSION PROTECTION
	Reinforced Soil Slopes	✓		✓	SOIL REINFORCEMENT; EROSION PROTECTION
	Embankments on Soft Ground		✓*		SOIL REINFORCEMENT; SEPARATION
	Pile Supported Embankments		✓		REINFORCEMENT; SEPARATION
	Sludge Pond Caps		✓*		REINFORCEMENT; SEPARATION; FILTRATION
	Void Bridging		✓		REINFORCEMENT; SEPARATION

*** In some cases, Mirafi® HP-Series or RS-Series goetextiles are used in these applications. Talk to your local TenCate Geosynthetics technical representative to identify the correct reinforcement for your project.**

Retaining Walls

Segmental, Wrapped Faced, Temporary Retaining Walls

Geosynthetic reinforced retaining walls have a slope angle that is typically greater than or equal to 70 degrees and includes multiple horizontal layers of geosynthetics, that act as reinforcements for the soil used as infill materials.

Segmental Retaining Wall

Green Face Wall

Temporary Geosynthetic Wall

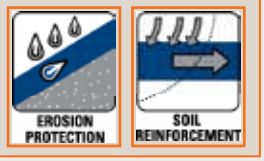
Advantages of TenCate® Retaining Wall Solutions vs. Traditional Retaining Structures:

- Construction
  - Minimum excavation needed behind exposed face
  - Native backfill used (including non-plastic fines)
  - Drainage provided with geotextiles
  - Skilled labor requirements reduced
- Performance
  - Long track record of superior performance
- Durability
  - Manufactured to create a long-lasting system
- Aesthetics
  - Variety of colors, shapes, and styles, including vegetated or synthetic grass
- Cost
  - Lowest cost retaining system available

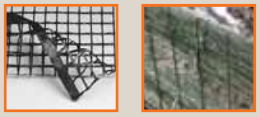
TenCate Mirafi® geosynthetics solve permanent and temporary retaining wall strength, stability, and face exposure challenges.

- Retaining walls constructed with geosynthetics maintain tensile strength in the backfill area, which takes pressure off the wall face and allows for more options in the wall facing.
- Wrapped faced walls made with Mirafi® geosynthetics offer a suitable green solution by using natural vegetation at the face.
- Miramesh® geotextiles have a high UV package that offers a permanent solution to wrap face retaining walls.
- Temporary walls reinforced with Mirafi® geosynthetics are a valuable tool for construction sites that need to divert traffic or water flow while maintaining the existing surroundings.

Functions



Products



Miragrid® XT | Miramesh®

Case Study

application	Geogrid Reinforcement
location	Fredericksburg, VA, USA
products	Miragrid® XT Geogrids

Reinforced Soil Slopes

Vegetated, Wrapped Faced

As with retaining walls, the reinforced soil slope (RSS) utilizes multiple horizontal layers of geosynthetics that act as reinforcements for the soil used to construct the slope. Utilizing geosynthetic reinforcement allows engineers to design steeper slopes with a suitable factor of safety. By definition, the RSS has a slope angle that is typically less than 70 degrees.

Vegetated Slopes

Wrapped Face Slopes

Advantages of TenCate® RSS Solutions vs. Traditional Retaining Structures:

Construction

- Maximization of limited right-of-way sites
- Lower site-development costs
- Reduced construction timelines

Performance

- Ability to increase slope angles
- Minimization of land acquisition costs and maximization of useable land space
- Cost effective alternative to traditional retaining walls

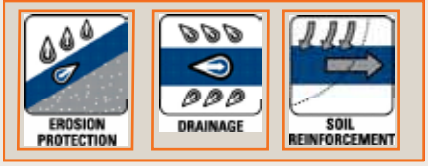
Aesthetics

- Pleasing appearance with a "green structure"
- Environmentally friendly vegetated surfaces

TenCate Mirafi® geosynthetics provide tensile strength and stability, thereby allowing the construction of steep reinforced slopes within limited property line boundaries. Moreover, our materials enable slopes to be constructed to any height at any slope angle. By permitting the slopes to be vegetated or covered by another facing material, Mirafi® geosynthetics also factor in safety by preventing sliding, rotation, and erosion.

At TenCate Geosynthetics, we take a hands-on, active approach to every challenge. The key component with RSS is engineering, and TenCate understands that better than anyone. Our experts see the demands faced by our customers and go above and beyond what is expected to deliver the best solutions possible. In fact, our expertise is a resource for our entire value chain.

Functions



Products

Miragrid® XT | Miramesh® GR

Case Study

application	Slope Reinforcement
location	Yeager Airport, Charleston, WV, USA
products	Miramesh® GR, Miragrid® 10XT & 20XT, Mirafi® G200N

Reinforced Embankments

Embankments on Soft Ground

Reinforced Embankment

Reinforced embankments on soft ground utilize very high strength polyester geotextiles to provide bearing stability to soil embankments.

Advantages of TenCate Reinforced Embankment Solutions:

Construction

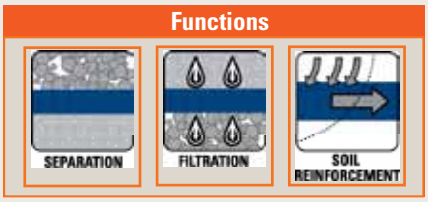
- Higher embankments and steeper side slopes permitted
- Working platforms created
- Faster construction time
- More economical than other ground improvement options

Building embankments on weak foundations can be a construction challenge. Long-term effects of settlement and bearing instability can put surface improvements at risk. However, TenCate Geosynthetics can not only provide long-term stability, they can eliminate the need for costly over excavation, or other ground improvement options.

Performance

- Reduction of construction time and required space
- Improved short and long-term embankment stability
- Promotion of more uniform settlement

Depending on the project specifications, Mirafi® geotextiles can be used directly on the soft foundation, over prefabricated vertical drains (PVD's) or over drainage material prior to the placement of the embankment fill. The fill material can then be added. Consequently, the low shear strength of the foundation material is reinforced and the subgrade is kept separated from the structural fill. When used in this manner, TenCate geosynthetics offer stability and limit differential settlement—just two of the measurable benefits our materials bring to our customers.



Case Study

application	Embankment on Weak Subgrade
location	Timmins, Ontario, Canada
products	Mirafi® PET 600/100

Load Transfer Platform for Pile Supported Embankments

Pile Supported Embankments

Pile Supported Embankment

Constructing an embankment on soft ground adjacent to a rigid structure (i.e. bridge or existing embankment) can create significant problems due to differential settlement. In cases where settlement is not acceptable, pile supported embankments are often used. In a soil embankment application, transferring the embankment load to the piles is critical to performance. High strength geosynthetics provide a cost effective solution to transfer the load.

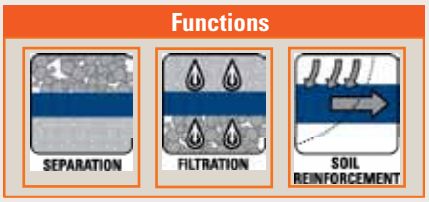
Advantages of TenCate Pile Supported Embankments:

Construction

- Reduces cost by reducing size of pile caps
- Reduces cost by increasing pile spacing, thus reducing total length of installed piles
- Faster construction time due to fewer piles to install
- Raker piles are not needed

Performance

- Improved long-term stability
- Reduction or elimination of settlement
- Increased overall stability



TenCate Mirafi® geosynthetics solve the challenges of constructing embankments on soft ground. Research has shown that utilizing a single layer of high strength reinforcement is more effective than using multiple layers of lower strength reinforcement because the strain cannot be uniformly distributed across multiple layers. The lower layers can be overstressed before the upper layer strengths are mobilized.

Case Study

application	Pile Supported Embankment
location	Lakeland, FL, USA
products	Mirafi® HS400 & BXG11

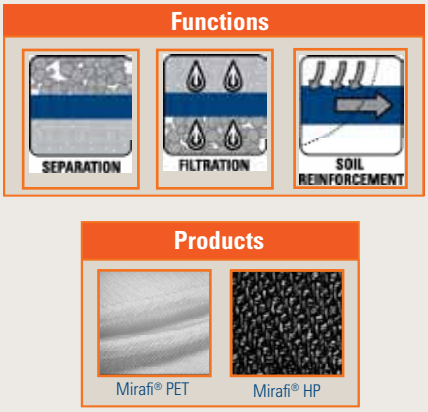
Sludge Pond Capping

When needing to provide a safe, cost effective method of capping and stabilizing sludge ponds, cells and lagoons, TenCate Geosynthetics has the solution. Facilitate the site closure by employing Mirafi® HP or PET Series geotextiles to stabilize the soft cell contents and create a working platform for select fill placement. Mirafi® HP and PET Series provide high tensile strengths at low elongations and high cross direction seam strengths to support fill placement over very low shear strength materials, as well as durability to survive severe installation stresses.

Advantages of Sludge Pond Capping:

Construction

- Minimizes construction time and cost by eliminating the need for excavation or chemical stabilization of the weak cell contents.
- Allows the removal of surface water by filtering or retaining the fine sludge particles of the low shear strength material.
- Provides critical separation between subgrade and select fill.
- High seam strengths allow faster deployment of the geotextile and facilitates safe placement of select fill.



Voids Bridging

Failure of roads, foundations, flexible membrane liners and other earthen structures due to loss of subgrade support caused by subgrade voids can be prevented. Mirafi® PET Series geotextiles or Miragrid® XT Series geogrids, acting as "tensioned membrane", spans the void and helps to prevent or minimize the effect of subgrade failure. Installing single or multiple layers over areas subject to circular or longitudinal voids provides tensile strength to the soil and transfers overlying normal soil or waste loads away from the void area, preventing excessive differential settlement.

Advantages of Voids Bridging:

Construction

- Increases allowable waste height in MSW landfills.
- Installs easily during the construction of the facility.
- Increases useable space.
- Eliminates the need for excavation and replacement.
- Lowers site development costs.
- Speeds construction of a facility.
- Supports sensitive liners.

Did You Know?

TenCate Geosynthetics manufactures geotextiles that are stronger than geogrid. TenCate Geosynthetics (PET) geotextiles have tensile strengths up to 1,600 kN/m (110,000 lb/ft).

TenCate Miramesh® geotextiles provide some of the highest UV durability reinforcement available, allowing for permanent green face walls and slopes.

TenCate Miragrid® geogrid identifies the style name and tensile strength direction right on the geogrid. This makes for easy identification in the field.

TenCate Geosynthetics in-house laboratories are accredited by GAI-LAP and A2LA. The on-site laboratories allow for a rigorous Quality Control (QC) program.

All TenCate Miragrid® XT geogrids are made in the USA. All are manufactured at the TenCate facility in Cornelia, GA.

GEOSYNTHETICS

TenCate develops and produces materials that increase performance, reduce costs and enable people to achieve what was once unachievable. Our goal is to contribute significantly to progress in the industries in which we work.

Miragrid® XT
High strength reinforcement geogrid comprised of high tenacity polyester fibers coated with a polymer coating.

Mirafi® PET
High strength reinforcement geotextile comprised of high tenacity polyester fibers.

Mirafi® HP
High performance reinforcement geotextile comprised of polypropylene fibers.

Miramesh® SG
Biaxial reinforcement geosynthetic comprised of green polypropylene fibers.

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