

TENCATE
Mirafi[®]

GEOSYNTHETICS
The Difference We Make



TenCate™ Geosynthetics North America – The World Leader TenCate™ Geosynthetics North America, headquartered in Pendergrass, Georgia, is the world's leading developer, manufacturer and provider of geosynthetic materials. Our 300-year history as TenCate is marked by the consistent development of geosynthetic solutions engineered to withstand nature's most extreme, challenging and unpredictable forces. When landforms shift, rain falls, or ice forms, TenCate™ Geosynthetics is prepared to provide reliable solutions that withstand not only nature, but the test of time.

We know that being the global leader in geosynthetics comes with great responsibility. That is why we take great pride in our products, our people and our commitment to quality. In response to the increasing demand for geosynthetics, TenCate™ Geosynthetics has created three distinct global product brands:

TENCATE
Mirafi®

Mirafi® geotextiles are engineered to provide high-performance system solutions for Roadway & Railway Construction, Water Management, Environmental Waste Management and Erosion Control applications.

TENCATE
Miragrid®

Miragrid® geogrids are highly advanced soil reinforcement products for Mechanically Stabilized Earth applications.

TENCATE
Geotube®

Geotube® containment technology is engineered to provide innovative solutions to the shoreline protection and marine structure construction markets.

The products within these three brands enable our customers worldwide to increase overall performance, reduce costs and achieve what was once thought unachievable. Our products make a difference...to our customers and to the environment.





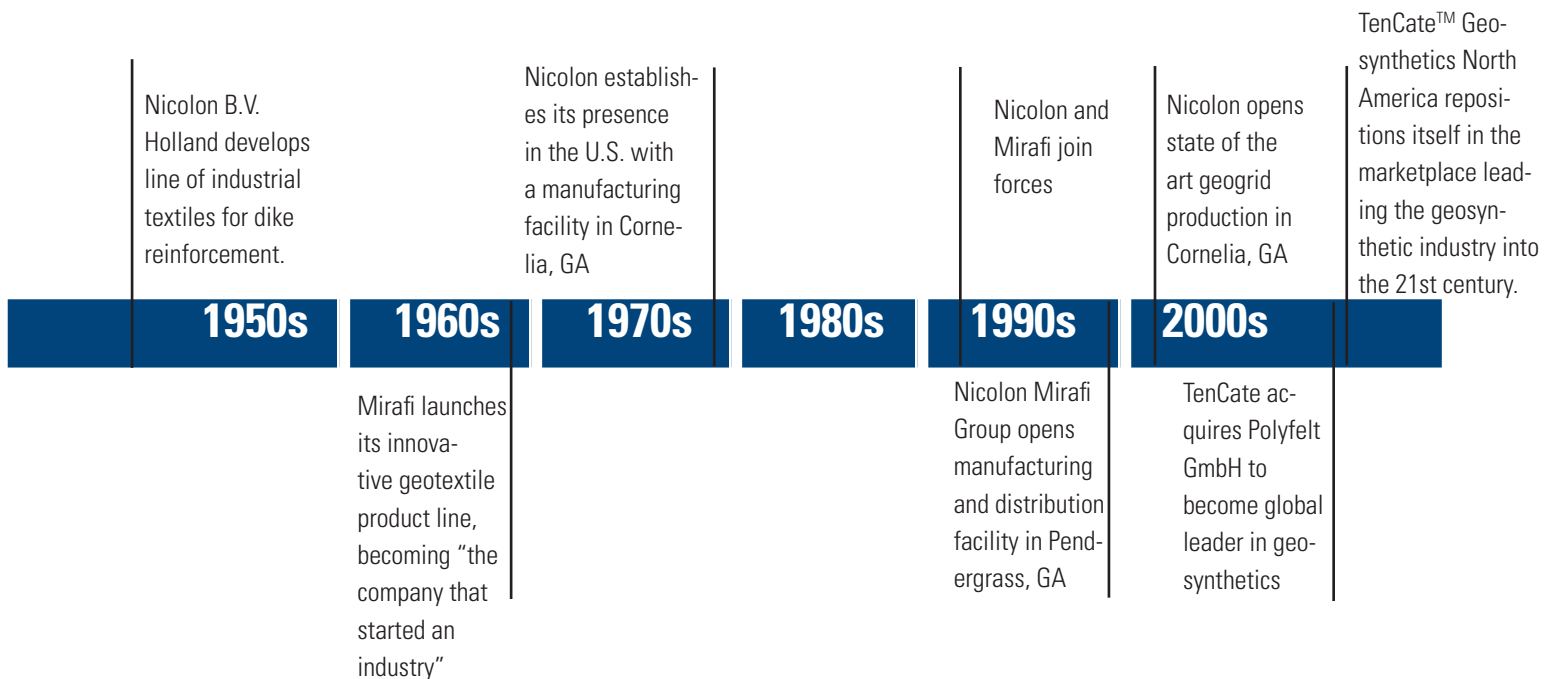
Our History The Holland Flood of 1953 launched TenCate’s quest for innovative product development. The country’s leaders turned to Nicolon B.V. of Holland for its revolutionary new industrial materials that prevented flood damage and insured the strength and stability of Holland’s dike systems.

TenCate’s North American history began in the late 1960s in Charlotte, NC, with the development of a new fabric called Mirafi® that used an experimental line of MIRAcle Fibers. In 1980, Nicolon Corporation, a division of Royal Ten Cate (USA) Inc. opened in Cornelia, Georgia in response to the growing demand for advanced geosynthetics in North America, as well as the world. The brand name Mirafi® is now widely recognized as “the company that started an industry.”



In 1991, Nicolon Corporation and Mirafi® formed the Nicolon/Mirafi® Group. As part of Royal Ten Cate’s worldwide structure, the Nicolon/Mirafi® Group is now known as TenCate™ Geosynthetics North America. By offering progressive system solutions in a diverse range of applications and markets throughout the world, TenCate™ Geosynthetics North America continues to set the standard as the foremost leader in the geosynthetics industry.

Koninklijke TenCate nv, corporate headquarters in Almelo, the Netherlands.



The Difference TenCate™ Geosynthetics Make...

Roadway/Railway Construction



Massachusetts Site Development

application | Subgrade & Base Course Reinforcement
location | Natick Mall Expansion, Natick, MA
products | Mirafi® HP570 & BXG11



Illinois Road Repair

application | Pavement Restoration
location | Martin Street, Newton, IL
products | Mirafi® MPV500CS



Utah Roadway Construction

application | Roadway Construction
location | St. George, UT
products | Mirafi® BXG12



Port of Long Beach Expansions

application | Subgrade Stabilization & Base Reinforcement
location | Port of Long Beach, CA
products | Mirafi® HP570

Mechanically Stabilized Earth



Yeager Airport Expansion

application	Reinforced Slope
location	Charleston, WV
products	Miramesh® GR, Miragrid® 10XT & 20XT, Mirafi® G200N



Virginia Roadway Expansion

application	Geogrid Reinforcement for Wall
location	Fredericksburg, VA
products	Miragrid® geogrid

Shoreline Protection/Marine Structure Construction



Port of Lake Charles Protection

application	Subgrade Stabilization/Separation
location	Calcasieu River, Foreshore Dike, LA
products	Mirafi® FW404 & HS900PP



Atlantic City Boardwalk Protection

application	Sand Dune Construction
location	Atlantic City, NJ
products	Geotube® Containers

Roadway/Railway Construction

Mirafi® geosynthetics enhance the performance and the design life of transportation engineering structures such as roads, railways, airfields and earthworks. For these applications, Mirafi® geosynthetics are installed as separation and filter layers in areas where groundwater is a problem. TenCate™ Geosynthetics offers the ideal characteristics of robust mechanical properties coupled with high water flow capabilities.

Roads/Airfields

Mirafi® geosynthetics are placed on top of soft sub-grades prior to placement of the granular sub-base layer to prevent the loss of the granular sub-base material into the soft sub-grade; therefore, maintaining the structural integrity and extending the maintenance-free life of the pavement.

Earthworks

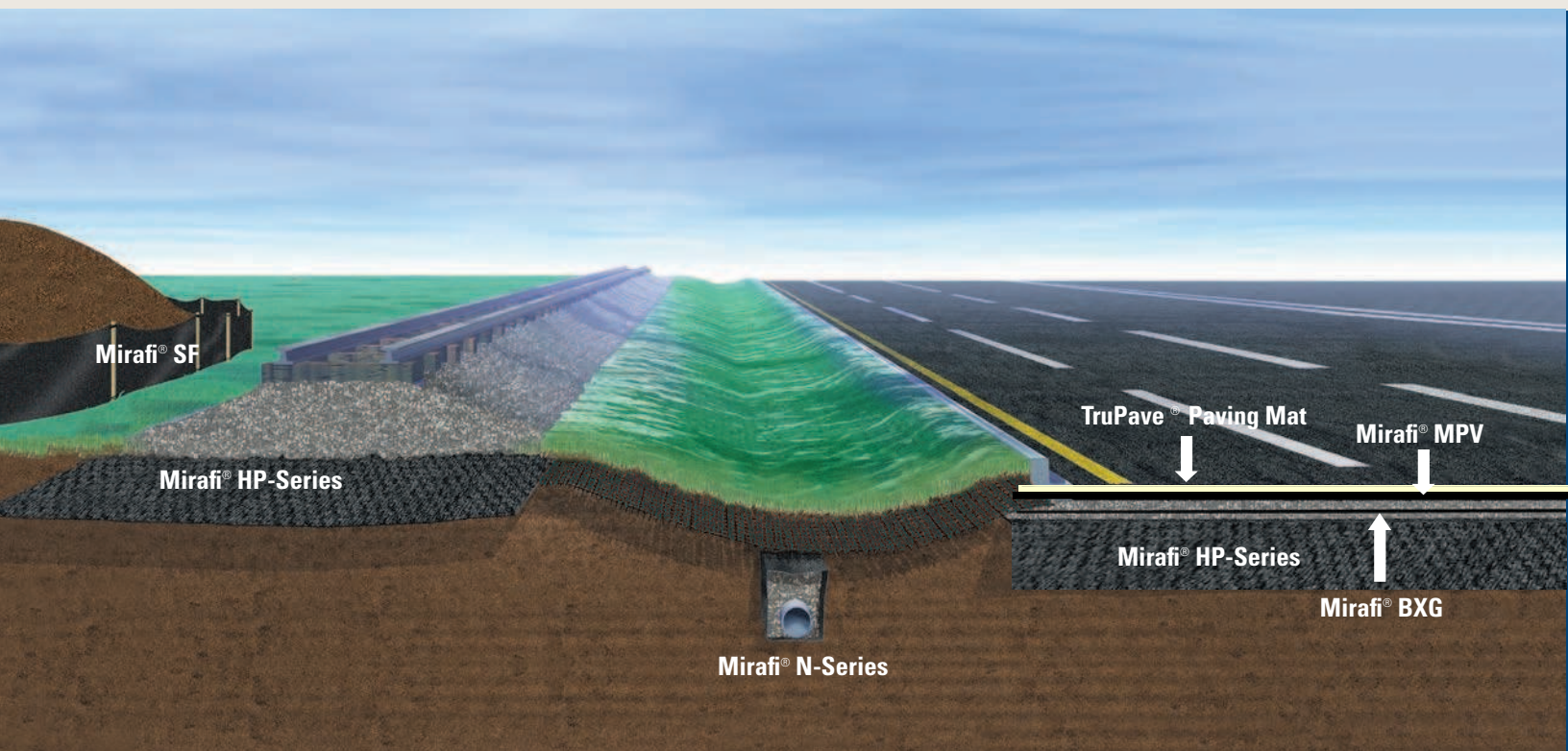
In earthworks construction, Mirafi® geosynthetics are placed between two different kinds of fill to ensure that intermixing does not occur during placement and compaction, maintaining the distinct layer boundaries between dissimilar adjacent earth-fill materials and their structural integrity.

Subsurface Drains

Mirafi® geosynthetics filter and allow groundwater to pass into the subsurface drain without eroding the soil, and thus ensuring long-term performance. of pavement and earthworks structures.

Railways

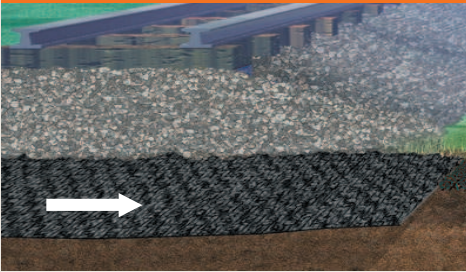
In railway tracks, Mirafi® geosynthetics are placed between the existing formation and the ballast layer to prevent the sub-grade from pumping into the ballast layer, thereby maintaining structural integrity and increasing the periods between track maintenance.



Products

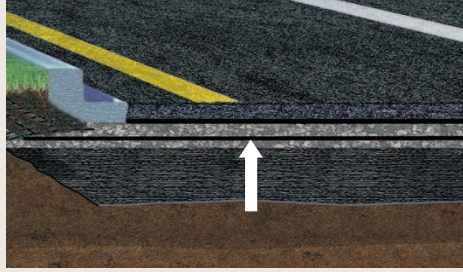
The comprehensive range of TenCate's™ transportation engineering solutions is unmatched in the geosynthetics industry.

Mirafi® HP-Series



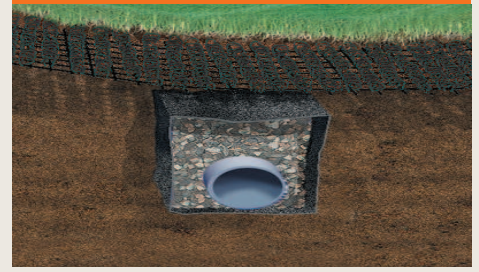
Mirafi® HP-Series high performance geotextiles are used for base course reinforcement and soil stabilization/reinforcement applications. Produced from high tenacity polypropylene yarns, HP-Series Geotextiles are specifically designed to provide separation, filtration, and reinforcement for moderate to severe site condition. These geotextiles are extremely versatile, ensuring long-term performance in new roadway construction. The combination of high tensile strengths and excellent filtration/separation characteristics make Mirafi® HP-Series geotextiles the complete geosynthetic.

Mirafi® BXG Geogrid



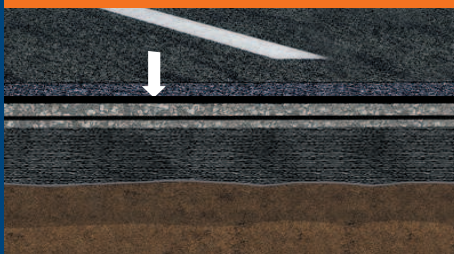
Mirafi® BXG biaxial geogrids are used for base course reinforcement and soil stabilization applications. They offer high strength at low strain and are designed for maximum bearing capacity and shear resistance. Mirafi® BXG geogrids are constructed of high tenacity, high molecular weight woven polyester to deliver increased passive bearing resistance. Coated with a polymer coating, Mirafi® BXG geogrids provide optimum interaction in all soil types.

Mirafi® N-Series



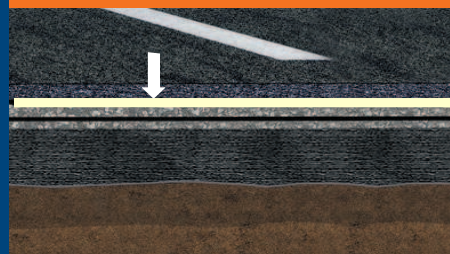
Mirafi® N-Series nonwoven polypropylene geotextiles are staple fibers used for soil separation and drainage. They combine high tensile strength, along with excellent physical and hydraulic properties. This aggressive geotextile is designed to handle many environmental problems found in roads, embankments, airfields, landfills, and sports construction projects. Produced from polypropylene staple fibers, Mirafi® N-Series geotextiles combine high water flow rates and durability while providing excellent soil retention.

Mirafi® MPV



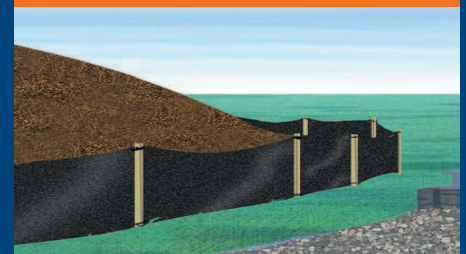
Mirafi® MPV nonwoven asphalt overlay fabric consists of needle-punched heat-set polypropylene. This polypropylene is known to be essential in fabric overlay pavement performance due to its strengthening of entire pavement systems and its lengthy performance life. Mirafi® MPV asphalt overlay fabric provides a waterproof barrier to protect sub-grade soils from surface water and a stress-relieving interface to retard reflective cracking and improve fatigue resistance.

TruPave® Reinforced Paving Mat



TruPave® engineered paving mat is a nonwoven pavement interlayer composed of high strength fiberglass and polyester fibers conforming to ASTM D-7239. It is designed with low elongation and high tensile strengths to reinforce the pavement section and retard reflective cracking in overlay applications. TruPave installed with an asphalt tack coat creates a moisture barrier between the existing pavement and new overlay thus dramatically increasing the life of the pavement. TruPave is millable and fully recyclable.

Mirafi® SF



Mirafi® Silt Fence controls sediment runoff from construction sites—its woven structure captures fine-grained sediment, while allowing storm water to pass through at a moderate rate of speed, without erosion.

Mechanically Stabilized Earth

Miragrid® XT geogrids and Mirafi® geosynthetics are used as integral components in mechanically stabilized earth structures, such as steepened slopes, retaining walls, embankments on soft soil foundations, void spanning, and veneer reinforcement due to their high-tensile strength, low elongation, and low creep properties.

■ Steepened Slopes

To steepen soil slopes, Miragrid® XT geogrids and Mirafi® PEC geosynthetics are placed in layers during construction to provide tensile resistance and enhance stability. The facing of the slope can be grass or another facing material. This technique enables slopes to be constructed to any height at any slope angle.



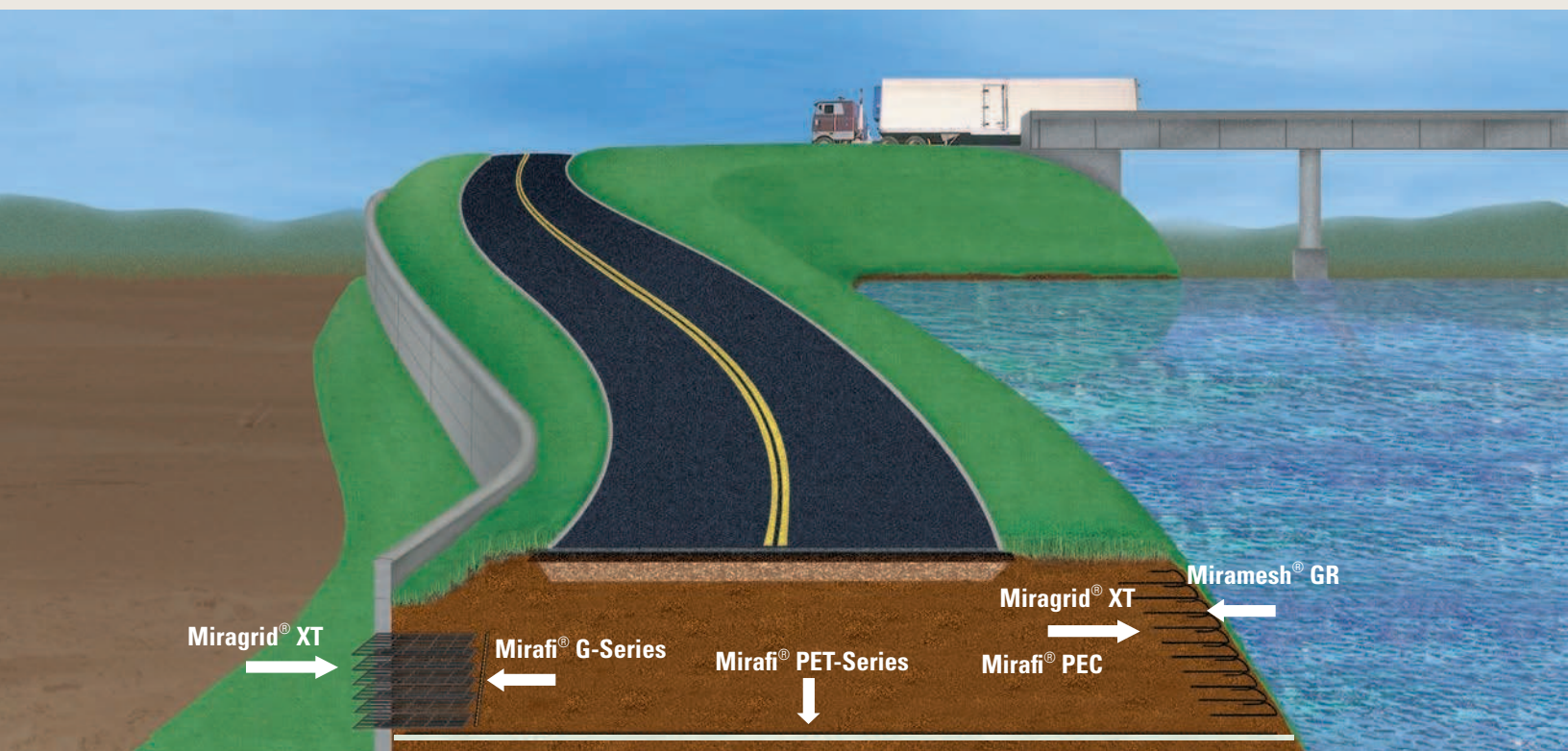
■ Retaining Walls

Miragrid® XT geogrids are used to provide stability to temporary and permanent retaining walls. Retaining walls constructed in this manner are economical, efficient and aesthetic.



■ Embankments on Soft Foundation Soils

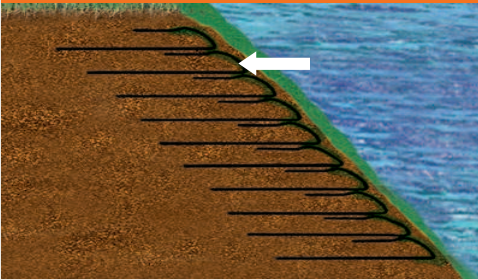
Mirafi® geosynthetics are placed at the base of embankments to provide stability and limit differential settlement. Depending on the specific application, the product may be placed directly on the soft foundation, over foundation piles, or over areas subject to void formation prior to the placement of the embankment fill.



Products

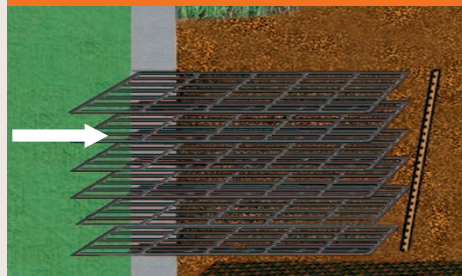
TenCate's™ reinforced soil engineering products provide tensile resistance to the soil which enhances its shear strength characteristics.

Miramesh® GR



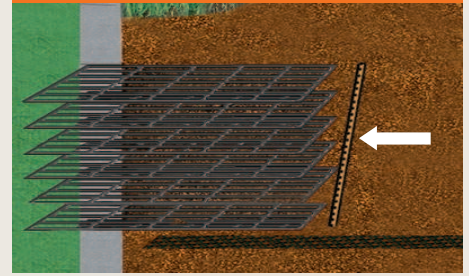
Miramesh® GR biaxial geosynthetics are used as a face wrap material for steepend slope applications. Miramesh® GR provides surface erosion protection, which facilitates vegetation growth and secondary reinforcement. Miramesh® GR is produced from highly UV-stable, green polypropylene yarn to provide a long-term grass green appearance.

Miragrid® XT Geogrid



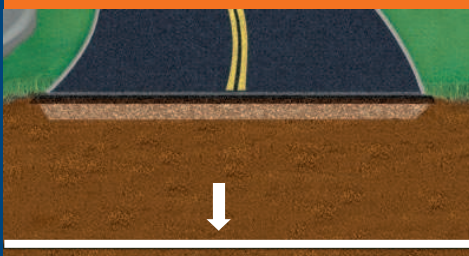
Miragrid® XT uniaxial geogrids are high performance woven polyester and polymer-coated geogrids used for soil reinforcement. Miragrid® XT uniaxial geogrids are used in Mechanically Stabilized Earth applications including internally reinforced walls, segmental retaining walls (SRW's), and steepend slopes. Miragrid® XT uniaxial geogrids provide high, long-term design strengths (LTDS) and excellent soil interaction. Miragrid® XT uniaxial geogrids are constructed of high tenacity, high molecular weight, woven polyester to deliver long-term performance.

Mirafi® G-Series



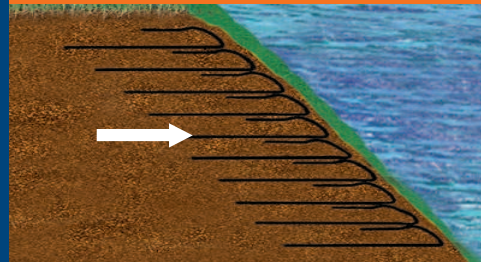
Mirafi® G-Series drainage composites are made from high compressive strength cores and combined with nonwoven filter fabrics to provide clog resistance and long-term flow capacity. These products are ideal single-sided subsurface filters and are used to provide a consistent drainage medium for retaining walls, cut-off drains, and landfill closures.

Mirafi® PET-Series



Mirafi® PET woven high-strength polyester geotextiles are used to provide stability and limit differential settlement when constructing embankments over soft soils. Mirafi® PET-Series geotextiles provide the highest tensile and long term design strength (LTDS) available in any geosynthetic. Mirafi® PET-Series are comprised of high tenacity and high molecular weight polyester yarns which provide excellent creep resistance, strength, and soil interaction.

Mirafi® PEC



Mirafi® PEC geocomposites are produced by combining high tenacity polyester yarn with a highly permeable nonwoven geotextile. Mirafi® PEC geocomposites combine the drainage and filtration properties of a nonwoven geotextile with the reinforcement properties of a high strength polyester geotextile for reinforced soil structures. This product is useful with poorly draining soils.

Shoreline Protection/Marine Structure Construction

Mirafi® geosynthetics and Geotube® containment technology are used as integral components in the design and construction of a variety of marine and hydraulic engineering structures such as revetments, breakwaters, levies and marine spoil containment structures. The materials used are easy to install beneath the water surface, in difficult conditions, and once in place provide continued performance.

■ Armored Revetments

A Mirafi® geosynthetic acts as a filter underneath revetments to prevent the erosion of soil. The armor protection on top of a geosynthetic can be a wide range of materials such as rock, gabions and mattresses, concrete pattern-placed units, etc. Applications range from river bank protection to coastal defense works.

■ Breakwaters

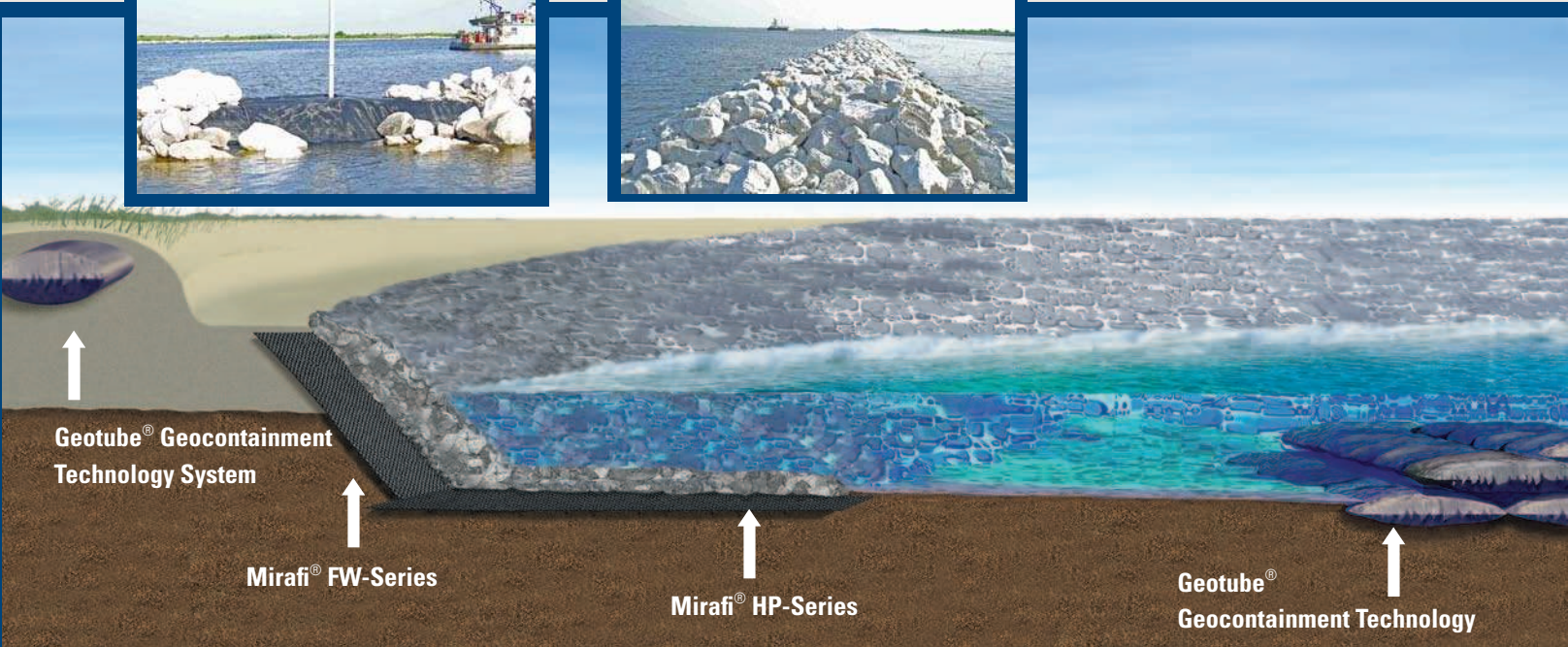
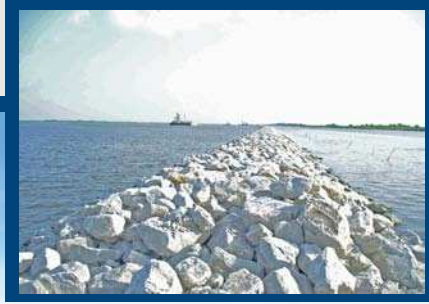
Geotube® containers can be placed offshore in areas where wave action is causing damage. The units disrupt the water flow and dissipates wave energy. The size and location of the structures can be engineered to encourage beach replenishment.

■ Sand Dune Cores

Geotube® containment technology has proven to be exceptionally valuable for protecting shorelines from erosion, particularly during hurricanes and tropical storms. The process is simple: a large tube made of specially engineered geotextile is filled with sand and buried under the beach.

■ Underwater Structures

Another aspect of Geotube® containment technology is the Geocontainer® unit, which is specifically designed to be filled before being placed in the water. Special split bottom barges are used to fill the containers, which are sewn shut once filled, then reinforced with rope ties.

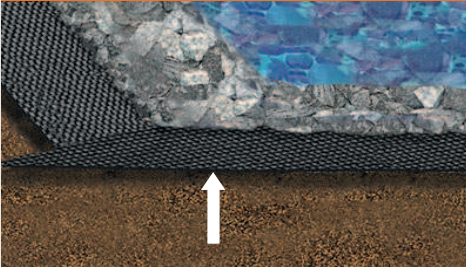


Products

Mirafi® marine engineering products offer excellent soil filtration and stabilization of shorelines and their enhanced strength prevents fabric damage during construction. Areas of product application include:

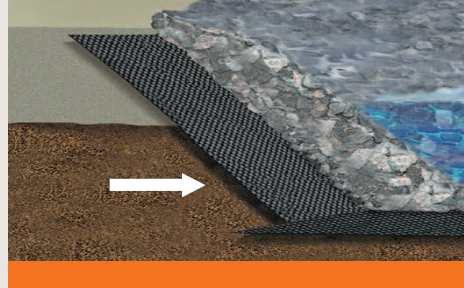
- under riprap or concrete revetment systems
- for erosion prevention of sand and dunes
- protection of slopes and around piers and abutments
- culvert inlet and discharge aprons
- floating silt curtain
- Geocontainer® to facilitate placement and retention of soil in underwater locations
- Geotube® containers for core stabilizing of jetties and beach heads

Mirafi® HP-Series



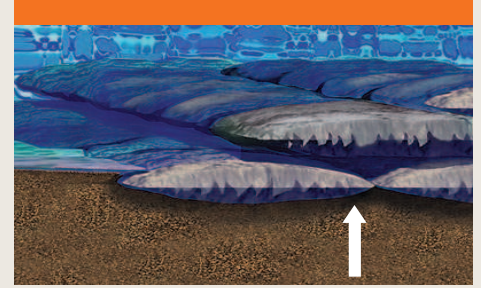
Mirafi® HP-Series high performance geotextiles are used to prevent the erosion of foundation soil in breakwaters and provide additional soil reinforcement. Produced from high tenacity polypropylene yarns, Mirafi® HP-Series Geotextiles are specifically designed to provide separation, filtration, and reinforcement for moderate to severe site condition. The combination of high tensile strengths and excellent filtration/separation characteristics make Mirafi® HP-Series geotextiles the complete geosynthetic.

Mirafi® FW-Series



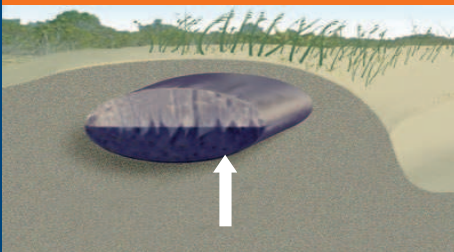
Mirafi® FW-Series geotextiles are made of highly UV stabilized monofilament and multifilament yarns that possess unique physical and hydraulic properties not found in other woven or nonwoven geotextiles. With highly durable strengths, consistent pore sizes, high flow rates, and clog resistance, this product is perfect for shorelines and other erosion control applications. Mirafi® FW-Series geotextiles are used underneath rip rap or concrete revetment systems along inland waterways and coastal shorelines to protect spillways and cut-off drains.

Geotube® GC



Geotube® geocontainment structures provide a more cost-effective and environmentally friendly method for the deep water disposal of contaminated soils. Additionally, they function effectively as erosion control products such as breakwaters.

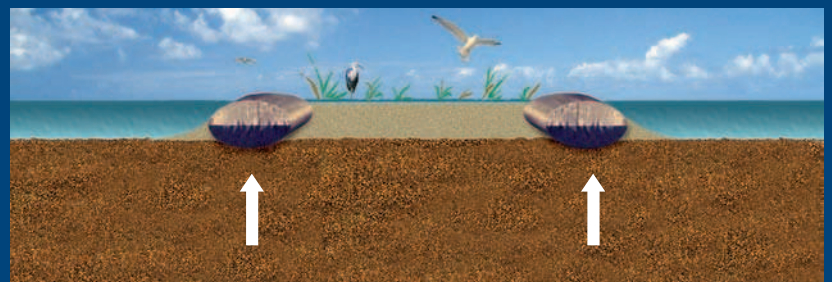
Geotube® Containment Technology



Geotube® structures, filled with locally dredged sand, limit storm erosion to the area immediately in front of itself by retaining the imported sand fill behind the tube.



Geotube® geocontainment technology structures used as jetties promote the natural restoration of shorelines by the process of beach accretion.



Geotube® structures are also used for wetland reclamation to create and retain the unique soil and water relationship that is indigenous to coastal marsh environments.

Waste Management

Mirafi® geosynthetics and Miragrid® XT geogrids are ideally suited to a variety of applications for landfill and waste-containment structures. Examples include protection layers for geomembrane liners, veneer reinforcement for the enhancement of material interface properties, reinforcement to steepen landfill containment slopes, reinforcement to support liner systems constructed over compressible foundations, reinforcement to reclaim tailings and other waste lagoons, and drainage for gas and liquid removal.

■ Geomembrane Protection

Mirafi® geosynthetics act as a protection layer for geomembrane liners in landfill and waste containment facilities. It protects the geomembrane from puncture, enabling its installation adjacent to natural ground and granular layers.

■ Veneer Reinforcement

Miragrid® XT geogrids are used as veneer reinforcement to improve the frictional interface between a sloping geomembrane liner and the adjacent soil layer. They are used to prevent the soil from sliding along the surface of the geomembrane liner.

■ Steepened Slopes

Miragrid® XT geogrids can also be used as reinforcement to steepen slopes in waste-containment facilities. This enables the maximum volume to be made available for the storage of waste.

■ Voids Bridging

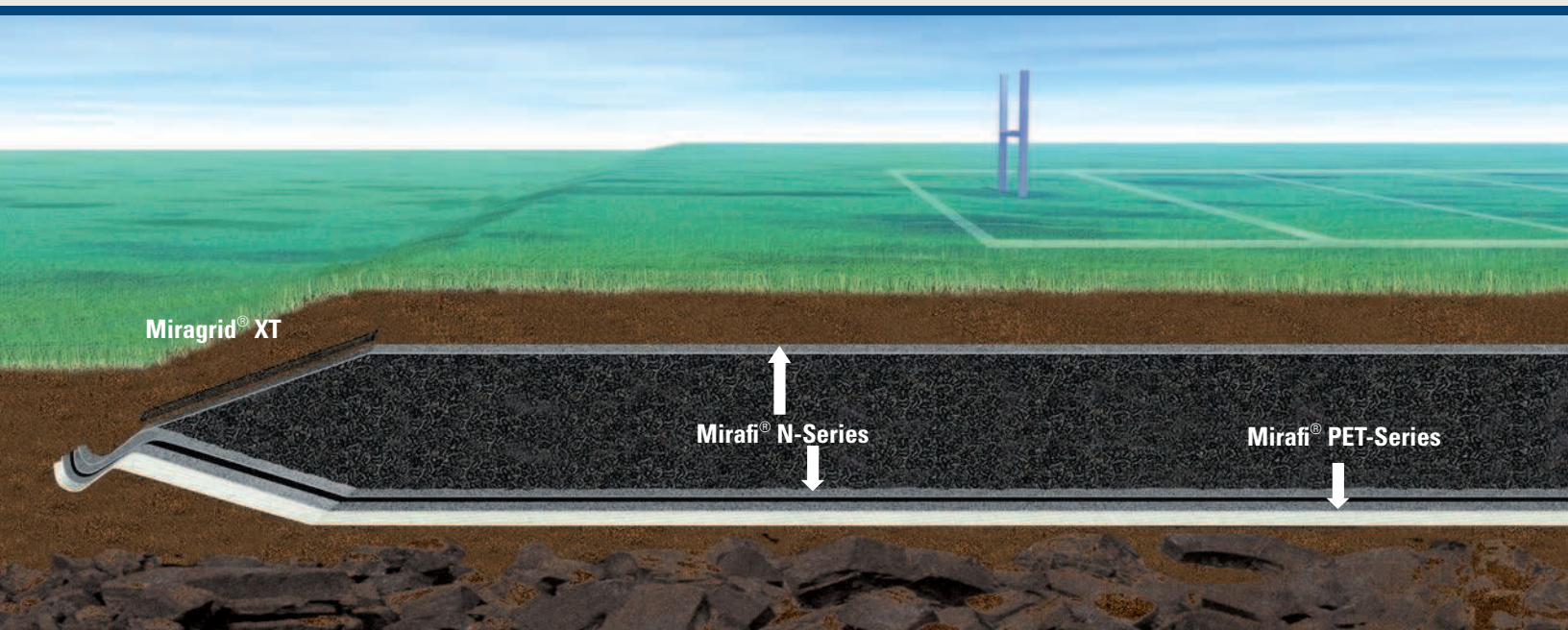
Mirafi® geosynthetics can be used to support liner systems when these are constructed over areas that are susceptible to differential settlements. The product ensures the integrity of the liner system is maintained as the underlying layer undergoes deformation.

■ Drainage

A Mirafi® geosynthetic is also used as a filter in the drainage layers of landfill and waste facilities. This facilitates the drainage of leachate and gases to outlet points.

■ Waste Lagoon Capping

The early reclamation of tailings and other waste lagoons can be performed using geosynthetics to facilitate the construction of capping layers. The use of a Mirafi® product with high tensile strength characteristics enables a capping layer to be economically constructed over disused tailings lagoons at an earlier stage than would be possible employing conventional techniques.

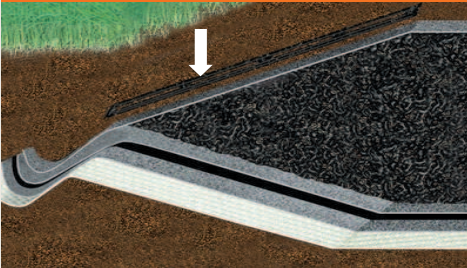


Products

The vast range of Mirafi® geosynthetics meet environmental engineering requirements in a wide variety of landfill and waste-containment applications:

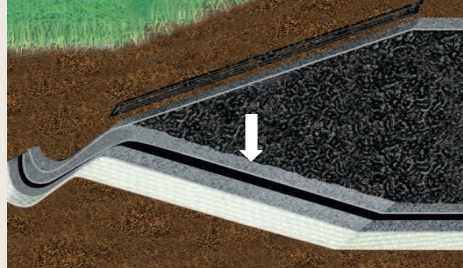
- veneer reinforcement for steepened slopes
- subsurface drainage for gas and liquid removal
- geomembrane liner reinforcement and protection
- stabilization of soft sludge for waste lagoon cappings.

Miragrid® XT Geogrid



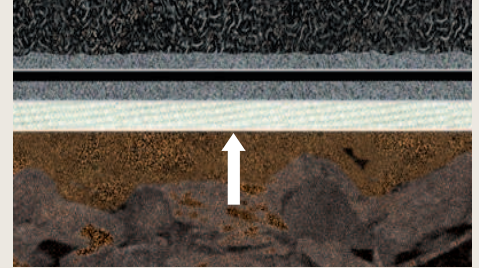
Miragrid® XT uniaxial geogrids are high performance woven polyester and polymer-coated geogrids used for soil reinforcement. Miragrid® XT uniaxial geogrids are used in Mechanically Stabilized Earth applications including internally reinforced walls, segmental retaining walls (SRW's), and steepened slopes. Miragrid® XT uniaxial geogrids provide high, long-term design strengths (LTDS) and excellent soil interaction. Miragrid® XT uniaxial geogrids are constructed of high tenacity, high molecular weight, woven polyester to deliver long-term performance.

Mirafi® N-Series



Mirafi® N-Series nonwoven polypropylene geotextiles are staple fibers used for soil separation and drainage. They combine high tensile strength, along with excellent physical and hydraulic properties. This aggressive geotextile is designed to handle many environmental problems found in roads, embankments, airfields, landfills, and sports construction projects. Produced from polypropylene staple fibers, Mirafi® N-Series geotextiles combine high water flow rates and durability while providing excellent soil retention.

Mirafi® PET-Series



Mirafi® PET woven high-strength polyester geotextiles are used to provide stability and limit differential settlement when constructing embankments over soft soils. Mirafi® PET-Series geotextiles provide the highest tensile and long term design strength (LTDS) available in any geosynthetic. Mirafi® PET-Series are comprised of high tenacity and high molecular weight polyester yarns which provide excellent creep resistance, strength, and soil interaction.



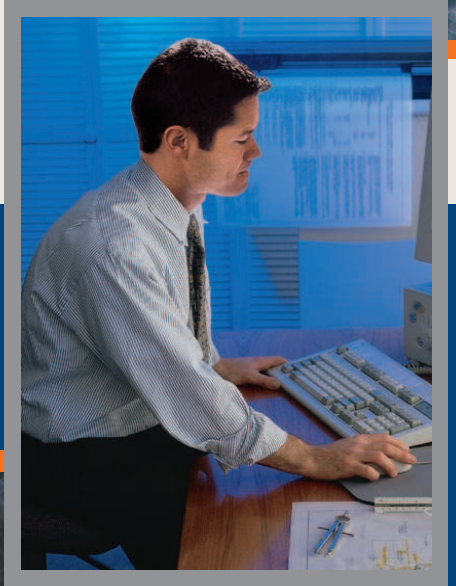
TenCate™ Services

TenCate's™ total customer service begins with the industry's most complete line of geosynthetic solutions, complemented by our worldwide product placement through the largest distributor network in the industry. Our distributors and agents maintain a local inventory of commonly specified products to prevent costly delays and give contractors ultimate scheduling flexibility.

Within our manufacturing facilities, our uncompromising commitment to quality is evidenced by our on-line and in-lab quality control testing procedures, which are performed strictly in accordance with industry guidelines.

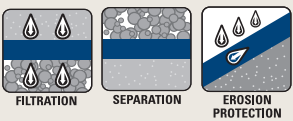
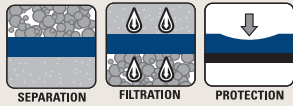
Most importantly, our ability to provide geosynthetic solutions is not limited to our existing product line. Because complex civil engineering projects often present problems that require non-standard products, our flexible manufacturing capabilities enable us to provide specialty geotextiles that are designed to satisfy your unique project requirements.

Because our engineers and technical support managers are experienced in both design and construction, we are pleased to provide qualified on-site assistance, project-specific consultation or expertise for group presentations.

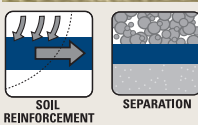
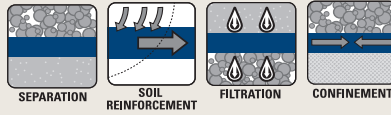


Your Complete Geosynthetics Range

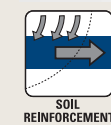
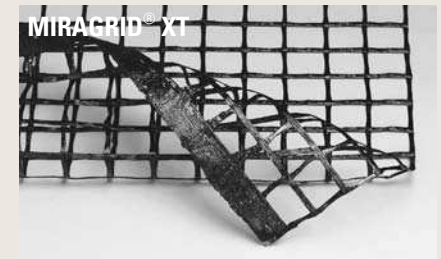
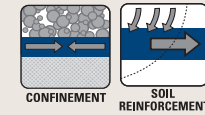
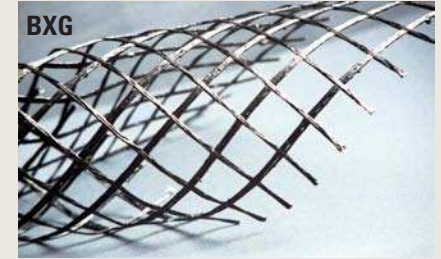
Drainage & Filtration Geotextiles



Soil Reinforcement Geotextiles



Soil Reinforcement Geogrids



	Mirafi® HP-Series	Mirafi® BXG-Series	Mirafi® X-Series	Mirafi® N-Series	Mirafi® FW-Series	Miragrid® XT	Mirafi® PET-Series
Transportation							
Site Drainage				✓	✓		
Separation/Stabilization	✓		✓	✓	✓		✓
Roadway/Reinforcement	✓	✓					✓
Sediment Control			✓	✓	✓		
Paving				✓			
Marine							
Armored Revetment Systems	✓			✓	✓		✓
Reinforced Soil							
Segmental Retaining Walls						✓	✓
Temporary Retaining Walls	✓	✓				✓	✓
Steepened Slopes	✓	✓				✓	✓
Embankments on Soft Soils	✓	✓				✓	✓
Environmental							
Waste Lagoon Capping	✓						✓
Sludge Dewatering	✓						✓
Voids Bridging						✓	✓
Veneer Reinforcement						✓	✓
Geomembrane Protection				✓			

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

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