

# TenCate GeoDetect®

Fiber Optic Sensing Geosynthetics

## OUR COMPANY

TenCate develops and produces materials that function to increase performance, reduce costs and deliver measurable results by working with our customers to provide advanced solutions.

## OUR PRODUCT

The use of fiber optics in structural health monitoring systems for civil engineering applications have been widely used for many years. By integrating fiber optic sensing into a geosynthetic, TenCate GeoDetect® is the first system designed specifically for geotechnical applications. The TenCate GeoDetect® solution embodies a geocomposite fabric, fiber optics, software and instrumentation to provide an innovative solution for the multifunctional requirements of a geotechnical application e.g. in-plane drainage capability, anchoring interface with the soil, protection of the optical fiber, reinforcement, separation and filtration in addition to data capture. It combines the benefits of geosynthetic materials with the latest sensing and measurement technologies to provide owners with unique information that drives risk reduction and, in some cases, cost reduction. TenCate GeoDetect® is a customizable solution created to meet the unique requirements of each project. Fiber Bragg Gratings (FBG), Brillouin scattering and Raman scattering are all proven fiber optic technologies that can be built into TenCate GeoDetect®. These technologies measure strain, strain & temperature or temperature only changes in soil structures.

Strain as low as 0.02% can be measured with a spatial resolution of 0.5 m. With the proper software, changes in temperature can be monitored at 0.1 C° with a spatial resolution of 1.0 m.

TenCate GeoDetect® can be used for long term monitoring, early warning system or short term performance evaluation. Continuous full time remote monitoring can transmit real time data for review and analysis. Project tolerances can be selected for early warning systems to be activated. Monitoring equipment can be accessed remotely or manually at the site depending on the needs of the project. TenCate GeoDetect® can be customized to fit the needs of your project.

TenCate GeoDetect® is an Innovation that Provides:

- Assurance the design materials are meeting or exceeding expected factors of performance.
- Early warning indication of changes in material performance or local conditions that were not expected, e.g. high strains, subsidence, voids, etc.
- A customized solution that will provide the owner with increased operating safety margin on certain demanding soil reinforcement applications, e.g. walls, steep slopes, embankments, levees, foundations, soft soils and subsidence (karst or mine) regions. This information can be used to lower long-term liability.

- More effective means of monitoring geosynthetic materials and soil structures in demanding applications, leading to better land use, and lower overall project costs.
- A positive impact on sustainability with lower risk and longer lasting structures due to its ability to monitor appropriate performance.

## OUR APPLICATIONS

The TenCate GeoDetect® solution is ideal for:

- Walls
- Embankments
- Slopes
- Levees
- Roads/Rails
- Landfills
- Pipelines

## OUR SERVICE

TenCate offers complete technical assistance. Our comprehensive service includes assistance during design, specification and throughout the process. TenCate makes the difference.



Protective Fabrics  
 Space Composites  
 Aerospace Composites  
 Advanced Armour

Geosynthetics  
 Industrial Fabrics  
 Grass

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## Fiber Optic Sensing Geosynthetics



TenCate GeoDetect® Fiber Optic

### TECHNICAL DATA

Fiber Optic		Units		FBG		BR
Minimum diameter		mm		0.9		2
Minimum strain detection		%		0.02		0.02
Connection to the textile				Knitting yarn		Knitting yarn
<b>TenCate GeoDetect® S Composite Strip</b>	<b>Test Method</b>	<b>Units</b>		<b>35</b>	<b>95</b>	<b>230</b>
Tensile strength	EN ISO 10319	kN/m	MD/CD	37/12	100/12	242/12
Elongation at maximum strength	EN ISO 10319	%	MD/CD	11.5/85	11.5/85	11.5/95
Tensile strength at 2% strain	EN ISO 10319	kN/m	MD	7.5	20	46
Tensile strength at 5% strain	EN ISO 10319	KN/m	MD	14	40.4	84.7
Friction properties in contact with sand (:40°)	EN ISO 12957-1	degrees		30°	30°	30°
Puncture resistance (CBR)	EN ISO 12236	kN		2.4	3.4	4.9
In the plane water flow capacity @ 20 kPa	EN ISO 12958	m3/s/m		20 10 <sup>-7</sup>	20 10 <sup>-7</sup>	20 10 <sup>-7</sup>
Weight per unit area (without optical cables)		g/m <sup>2</sup>		290	400	620
Standard width (Other width on demand) <sup>1</sup>		m		5.3	5.3	5.3
Standard Length(on demand) <sup>1</sup>		m		100-600	100-600	100-600

MD: Machine Direction, also direction of the optical cables

CD: Cross Direction

(1) Custom roll sizes available

The values given are average values obtained in our laboratory and in accredited testing institutes. The information given in this datasheet is to the best of our knowledge true and correct. However new research results and practical experience can make revision necessary. The right is reserved to make changes without notice at any time. No guarantee or liability can be drawn from the information mentioned herein.

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