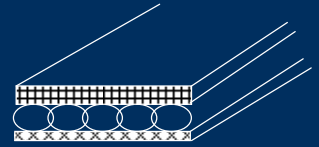


Geotube® Debris Shield
 Permeable Impact Resistant Composite Technology



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

Geotube® containment technology is a proven, cost-effective method for shoreline protection and marine construction projects.

Geotube® containers help protect shorelines, rebuild beaches and reclaim land from bodies of water. Geotube® containers are subject to damage from water carried debris, vandalism, boat propellers and a number of other situations. When the integrity of the geocontainer is compromised or damaged, the geocontainer loses its ability to provide protection.

TenCate’s latest patent pending innovation is a Debris Shield, which is a specially engineered composite geotextile providing impact resistance by dissipating energy from an impact force from water-carried debris.

This new technology provides additional protection against vandalism, UV and abrasion resistance. The Debris Shield will protect Geotube® containers and thereby extend their useful service life.

The Difference Geotube® Debris Shield Technology Offers:

- **Protection.** Flexible design can add partial or total protection around the Geotube® container.
- **Reinforcement.** Specially engineered design provides impact resistance and energy dissipation from impact force.
- **Durability.** Provides additional protection against UV, abrasion resistance and vandalism.
- **Aesthetics.** Offered in black or tan color for beach environment.



Geotube® Debris Shield encapsulating and protecting a Geotube® container from water-carried debris

APPLICATIONS

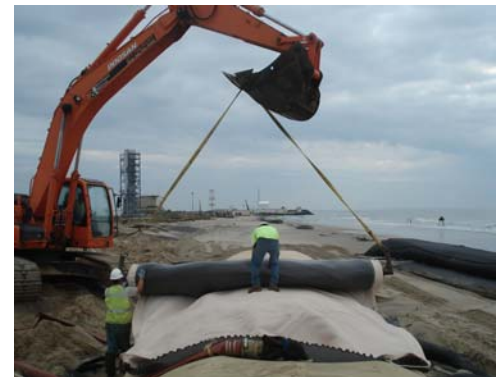
Other technologies do not offer the combined benefits of Geotube® Debris Shield. UV resistant shrouds are unable to provide equivalent impact performance. Coated containers can be vulnerable to damage from impact forces.

Once an installed Geotube® container has been damaged, the contained sand may spill out and compromise the integrity of the system. Moreover, as waves impact the Geotube® container, sand continues to escape and the height of the container decreases. The insufficient container height may then lead to potential erosion of the shoreline.

Geotube® Debris Shield can be designed to provide partial protection or total protection of a Geotube® container. This technology can be adapted to any environment; sand dune cores, jetties, dikes, groynes and river applications.

OUR SERVICE

TenCate™ offers comprehensive service that includes assistance during design and specification. With extensive knowledge and great customer service, TenCate™ makes the difference.



Mechanical Properties	Test Method	Unit	Typical Value	
			Machine Direction	Cross Direction
Tensile Strength (at ultimate)	ASTM D4595	lbs/in	1,000	1,000
Trapezoid Tear Strength	ASTM D4533	lbs	959	1,337
Tongue Tear	ASTM D2261 ¹	lbs	516	698
Impact Energy ²	ASTM E1886 ² ASTM E1996 ²	ft-lbs	2,105 ²	
Puncture Strength	ASTM D4833	lbs	689	
UV Resistance (% strength retained after 500 hours)	ASTM D4355	% Strength Retained	80	

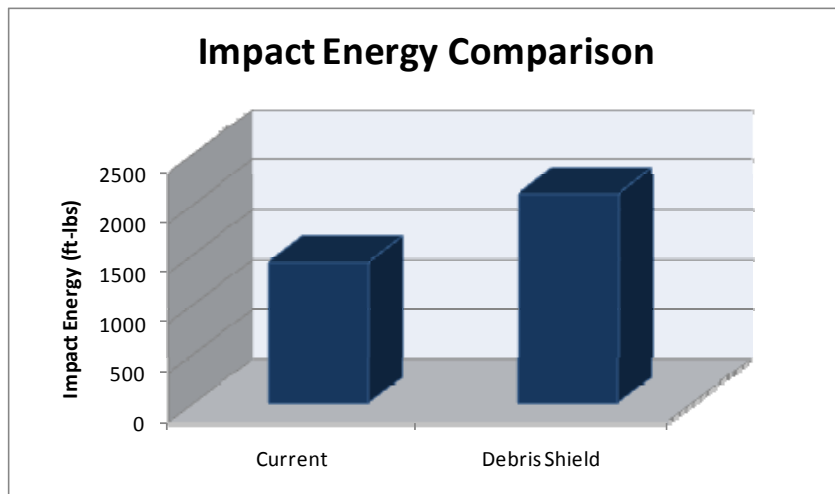
¹Modified ASTM Test Method

²Estimated Impact Energy (ft-lb) = mV^2/g

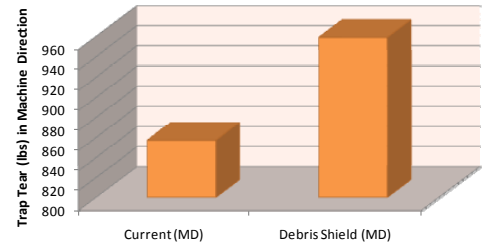
The Debris Shield offers improved performance and long term protection of Geotube® containers. The specially engineered 3-D structure provides additional resistance to tearing and ripping. The Debris Shield is engineered to provide an additional protection layer against impact, puncture, and UV resistance versus current Geotube® containment performance.



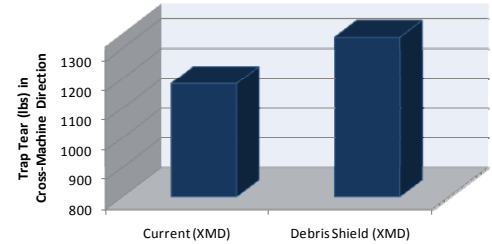
Impact testing conducted per the large missile impact test requirements of ASTM E1886/E1996.



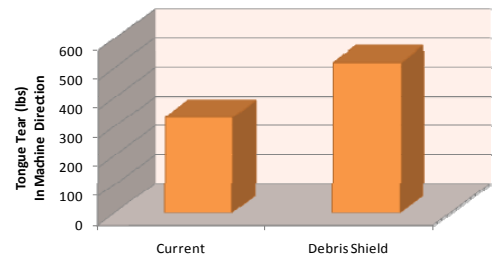
Trapezoid Tear Comparison (MD)



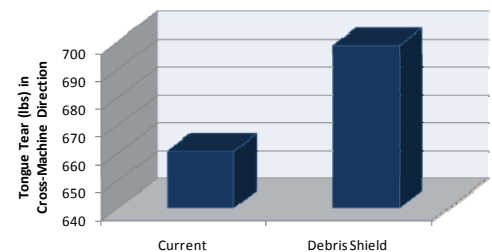
Trapezoid Tear Comparison (XMD)



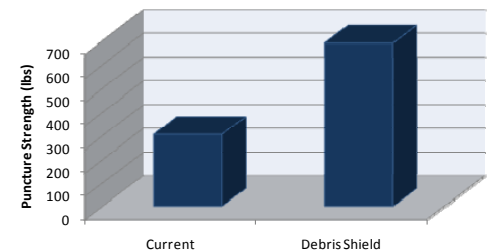
Tongue Tear Comparison (MD)



Tongue Tear Comparison (XMD)



Puncture Comparison



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