



# SHEAR FORCE

Soft Armor Rock Solid Protection

TM



## Introducing: ShearForce10 High Flow Erosion Control Turf Reinforcement Mat.

This new, patent pending erosion control product consists of a green, simulated turf monolithic polyethylene structure, backed with a specially engineered geotextile fabric. The simulated grass blades of the turf deflect rainfall impact and flow-induced shear stress away from the fabric backing and the underlying soil. The fabric backing is designed to hold fine soil particles in place, while facilitating seed germination and emergence for exceptional immediate erosion control and full

vegetation establishment. ShearForce10 is available in convenient 3 ft. wide and 6 ft. wide rolls for quick and easy installation.



*ShearForce10, Immediately after installation, can provide better erosion protection than conventional TRMs after a full 12 months of vegetation growth.*

## ShearForce10 offers the performance of reinforced turf from Day One that is on par with large riprap!

Proven in ASTM D6460 Unvegetated Channel Testing to drastically reduce soil erosion without vegetation at flow-induced shear stresses exceeding 11 lbs/sf, ShearForce10 offers more than three times the immediate channel erosion protection of conventional TRMs.

Once vegetated, ShearForce10 permanently protects the soil base, reinforces vegetation roots and increases the long term permissible shear stress of the vegetated system.





### Features and Benefits of ShearForce10 mats include:

- Reinforced turf performance from day one, no waiting on vegetation for effective erosion protection at shear stress > 10 lbs/sf
- Immediate erosion control equivalent to large rock riprap and other hard armor, at less than 1/2 the cost
- Simple installation, just lay it and anchor it, no heavy equipment required
- Aesthetically pleasing, green grassed-in finished look
- Environmentally friendly, facilitates water filtration and infiltration
- Highly UV stable and weather resistant, for permanent strength and durability
- Easy, low-cost maintenance with standard mowing equipment



### Typical Applications for ShearForce10 mats:

- High flow channels and extreme slopes requiring maximum erosion protection before, during and after vegetation establishment, including channels with constant low-flow discharge
- Drainage swales and slopes where an immediate vegetated look is desired and/or vegetation is slow to establish
- Projects in arid areas where vegetation establishment is very slow and sparse
- Overwinter project protection requiring several months of high performance erosion control without vegetation
- Moderate flow culvert outfalls, downchutes, spillways and dams
- Detention basins, lake shorelines, streambanks, canals, and levees

*Pictured at upper left: ShearForce10 installation on streambank.*



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### Recommended Design Values

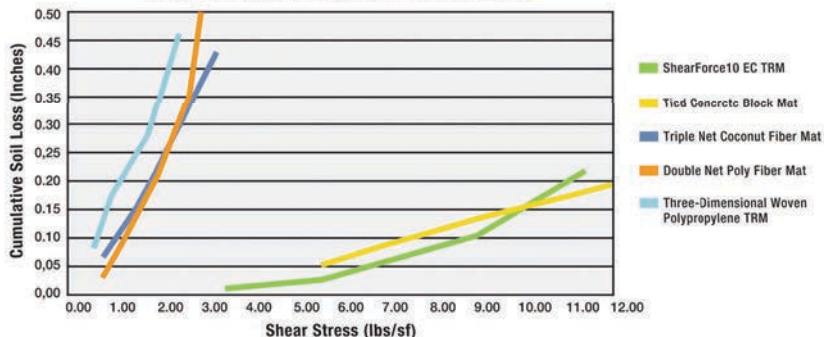
ShearForce10™ EC/TRM	Channels/Outfalls/Spillways/Streambanks*				Slopes	Shorelines	
	Manning's n	Design Shear Stress		Design Velocity		Max Gradient (h:v)	Max Wave Height
		Cohesive Soils	Non-Cohesive Soils	Cohesive Soils	Non-Cohesive Soils		
ShearForce10 <i>Unvegetated</i>	.025 – .040	12 lbs/sf	10 lbs/sf	25 ft/sec	20 ft/sec	>:1:1	<=1.0 ft
ShearForce10 <i>Vegetated</i>	.025 – .4	16 lbs/sf	14 lbs/sf	30 ft/sec	25 ft/sec	>:1:1	<=1.5 ft

\* Design values are derived from ASTM D6460 large-scale channel testing on loam soils under 4 consecutive 30 min flow events in 20% gradient test flumes. A safety factor (SF) of 1.25 - 2.0 may be applied in channel lining designs to account for longer flow durations, more erodible soils, and varying side-slope gradients.

Table #2

### Soil Loss vs Shear Stress

in ASTM D6460 Large-Scale Channel Testing of *Unvegetated* Turf Reinforcement and Erosion Control Mats (.5 Inch Cumulative Soil Loss Failure Criteria)



Sources – NOTE: All referenced large-scale channel tests conducted at TRI Environmental's Denver Downs Research Facility using ASTM D6460 testing protocol or modified versions thereof.

GrassWorx, LLC., 2018. ASTM D6460 Channel Testing of InstaTurf ShearForce10 EC TRM and ShearForce12 Scour Control Mats in 20% Test Flumes, August, October and December, 2018.

Motz Enterprises, 2018. Large-Scale Channel Erosion Testing of Flexamat Channel Lining, February, 2009.

AASHTO-NTPEP Large-Scale Channel Erosion Testing of North America Green's C350 Triple Net Coconut Mat, August, 2011. (Amended April, 2016.)

AASHTO-NTPEP Large-Scale Channel Erosion Testing of Western Excelsior's PPS-10, Double Net Poly Fiber Matting, May, 2014.

AASHTO-NTPEP Large-Scale Channel Erosion Testing of East Coast Erosion Control's T-RECS Permanent Turf Reinforcement mat, February, 2013. (Amended April, 2016.)