



SHEARFORCE™

10

ShearForce™ 10 Hybrid-Turf Instant Armor Mat

This new, patent pending erosion control product is an immediately effective, lower cost soft armor alternative to rock riprap and other hard armor materials. The ShearForce10 Instant Armor Mat utilizes simulated turf to effectively protect, grow and permanently reinforce natural vegetation in high flow areas. Providing rock-solid armoring from day one of installation, the ShearForce10 makes it possible to use more vegetation and less rock for stabilizing channels, slopes and shorelines. ShearForce10 is available in 3 feet wide and 6 feet wide rolls for quick and easy installation.



ShearForce10 provides immediately effective erosion protection under water flow powerful enough to wash out 24-inch rock riprap



ShearForce10 offers the performance of reinforced turf and large rock riprap from day one of installation.

Proven in ASTM D6460 Unvegetated Channel Testing to drastically reduce soil erosion at flow-induced shear stresses exceeding 11 lbs/sf, ShearForce10 offers more than three times the immediate channel protection of conventional TRMs.

Once vegetated, ShearForce10 permanently protects the soil base, reinforces vegetation roots and increases the long term erosion resistance of the vegetated system.



ShearForce10 installation in channel vs rock riprap.



SHEARFORCE **10**TM

Features and Benefits of ShearForce10 Hybrid-Turf Instant Armor mats include:

- Reinforced turf performance from day one, no waiting on vegetation for effective erosion protection at shear stress > 10 lbs/sf
- Immediate to permanent erosion control equivalent to large rock riprap and other hard armor, at less than ½ the cost
- Simple installation, just lay it and anchor it over seeded area, 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

Recommended Design Values

ShearForce TM 10 Hybrid-turf Instant Armor Mat	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 Unvegetated	.025 – .040	12 lbs/sf	10 lbs/sf	25 ft/sec	20 ft/sec		>1:1	<=1.0 ft
ShearForce10 Vegetated	.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.

Permanent Soft Armor Mats Permissible Shear Stress Ratings vs Rock Riprap

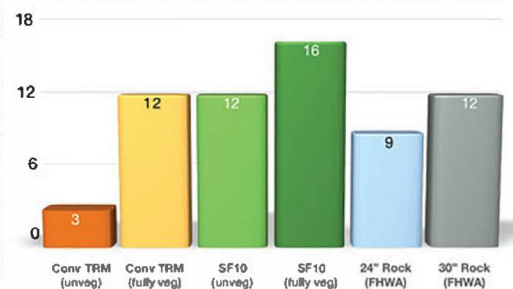
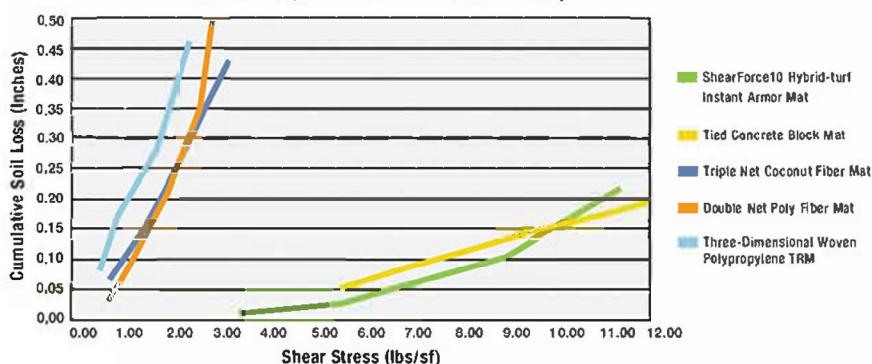


Table #2

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.)