InstaTurf®
Soft Armor

SHEAR FORCE 12™

ShearForce12 provides immediately effective erosion protection under water flow powerful enough to move 30-inch rock riprap.

ShearForce™12
Hybrid-Turf Instant Armor Scour Mat.

The patent pending ShearForce12 Hybrid-Turf Instant Armor Scour Mat is a cost-effective, soft armor alternative to rock riprap and other hard armor materials for protecting culvert outfalls and areas subject to turbulent water flow. ShearForce12 mats incorporate a 1/2 inch thick, weather resistant, perforated rubber core layered between simulated turf and engineered geotextile fabric for the highest level of scour protection available in a soft armor product.

Unlike other scour mats that require a separate TRM underlayment for sufficient initial erosion protection, ShearForce12 is an all-in-one, 3ft x 4ft, 30lb panel, that's simply installed directly on top of the seeded soil surface.

The simulated grass blades of the turf structure are designed to deflect rainfall impact and flow induced shear stress away from the apertures in the rubber core and the fabric backing. The turf structure further increases surface roughness when used in flow transition areas to slow water flow and reduce turbulence.

The rubber core provides an enhanced ballast effect and flow impact resistance, while vegetation grows up through its 1.5 inch apertures.

Proven in ASTM D6460 Channel Testing without vegetation to virtually eliminate soil erosion at flow-induced shear stresses exceeding 12 lbs/sf, ShearForce12 Mats offer immediate as well as permanent erosion protection equivalent to and exceeding 36 inch rock riprap.

ShearForce12 with new vegetation growth protecting pipe outfall.

InstaTurf® Soft Armor

SHEARFORCE 12™

www.Insta-Turf.com

Features and Benefits of ShearForce12 Hybrid-Turf Instant Armor Scour mats include:

- Maximum performance from day one, no waiting on vegetation for effective scour protection at shear stress > 12 lbs/sf
- All-in-one scour transition mat, NO additional TRM or other erosion control underlay required
- Cost-effective scour control alternative to large rock riprap and other hard armor systems
- 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 ShearForce12 mats

- High discharge culvert and pipe outfalls, and other flow transition areas
- Turbulent flow drainage channels, including those with constant low-flow discharge
- Detention basin, pond and lake shorelines (below/above normal waterline)
- Lake, river and canal banks (below/above normal waterline)
- Curb cuts and downchutes from parking lots
- Levees and spillways
- Downspout Protection
- Areas where vegetation establishment is very slow and sparse

Recommended Design Values

ShearForce™12 Hybrid-turf Instant Armor Scour Mat	Channels/Outfalls/Spillways/Streambanks*					Slopes	Shorelines
		Design Shear Stress		Design Velocity			
	Manning's n	Cohesive Soils	Non-Cohesive Soils	Cohesive Soils	Non-Cohesive Soils	Max Gradient (h:v)	Max Wave Height
ShearForce12 *Unvegetated*	.025 – .040	14 lbs/sf	12 lbs/sf	30 ft/sec	25 ft/sec	>1:1	<=1.5 ft
ShearForce12 *Vegetated*	.025 – .4	18 lbs/sf	16 lbs/sf	30 ft/sec	25 ft/sec	>1:1	<=2.0 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.

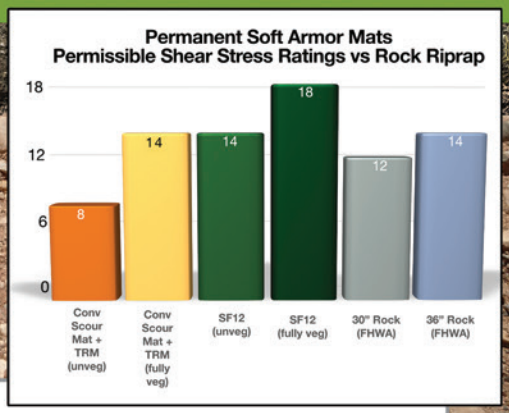
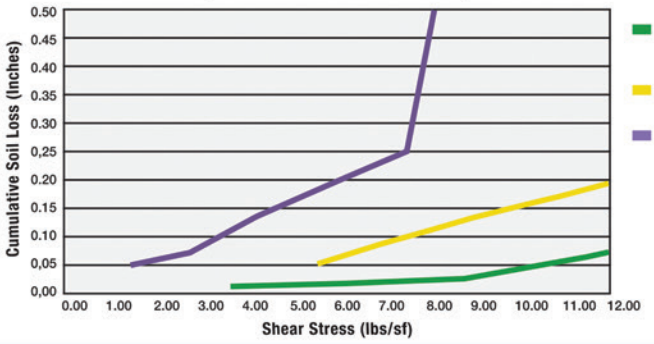


Table #4

Soil Loss vs Shear Stress

in ASTM D6460 Large-Scale Channel Testing of Scour Control Mats

(.5 inch Cumulative Soil Loss Failure Criteria)



- ShearForce12 Hybrid-turf Instant Armor Scour Mat *Unvegetated*
- Tied Concrete Block Mat *Unvegetated*
- Rubber Scour/Transition Mat with Triple Net Poly Fiber TRM Underlay – *Unvegetated*

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 American Green's ShoreMax Mats over P550-TRM, December 2011 (Amended April 2016)

GET A QUOTE:

Contact Tim Lancaster 812-483-1532, tim.lancaster@grassworxllc.com or go to www.insta-turf.com to find your local InstaTurf distributor

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- Extended-Term ECBs

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- Flex MSE Vegetated Wall System
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- Gabions
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- Stratavault Soil Cells

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