Woven Turf Reinforcement Mat (WTRM)

Durable, Continuously Woven Turf Reinforcement

PP5-Heavy Duty™ represents the state of the art in second generation Turf Reinforcement Mats (TRMs); consisting of continuously woven homogenous technology. Second generation Woven Turf Reinforcement Mats (WTRMs) consist of woven yarns manufactured to form a continuous, homogeneous three dimensional structure and are specifically designed for projects where field conditions include intermittent maintenance activity, structural backfills protecting critical structures, utility cuts, potential traffic areas or where higher factors of safety required and/or general durability is of concern. WTRMs provide a design life up to 25 years.

Comparatively, first generations TRMs consist of chopped fibers mechanically bound (stitched) between nettings or melt bonded (laminated) to form a continuous material. First generation TRMs provide adequate performance in low flow swales and moderate slope protection applications with anticipated minor maintenance activity and a design life of less than 10 years. First generations TRMs have proven to lack the durability, performance and functional longevity required to provide protection beyond 10 years or in situations with non-hydraulic stresses.

PP5-Heavy Duty™ is a fully synthetic, ultra-violent stable, second generation WTRM manufactured by weaving continuous, synthetic thread elements by way of a proprietary (patent pending) process to form a lofty, three dimensional pattern. The product is a woven homogenous, single layer WTRM that contains no laminated or stitched layers. PP5-Heavy Duty™ is defined as a medium loading/medium survivability WTRM that will provide a design life up to 25 years and provides the necessary tensile strength and durability for long-term performance. Physical properties of the PP5-Heavy Duty™ are presented in Table 1. Table 2 presents a summary of the mechanical performance properties of the material and Table 3 presents the hydraulic performance properties.

The unique balance between open area and density of the Heavy Duty WTRM optimizes the environment for rapid seedling emergence and provides for a mulching layer well suited for the establishment of vegetation from seed or sod, as evidenced by the vegetation establishment values shown in Table 2. Finally, the superior UV stability of the material provides for long-term performance over the life time of the project.

Each roll of PP5-Heavy Duty™ is manufactured under Western Excelsior's Quality Assurance Program to ensure consistent coverage, mass and strength. Quality control testing is performed at a GAI-LAP accredited facility in compliance with ASTM D4354. The material is made in the USA and consists entirely of components materials made in the USA.

Table 1. Material Physical (Index) Properties

Property	Test Method	Value
Mass Per Unit Area[2]	ASTM D6566	9.2 oz/yd^2 (312 g/m^2)
Thickness[2]	ASTM D6525	0.3 in (8 mm)
Light Penetration[2]	ASTM D6567	30 % open
Porosity[2]	Computed	96 %

Table 2. Mechanical Performance Properties

Property	Test Method	Value
Tensile Strength (MD) x (TD)[1]	ASTM D6818	2500lb/ft (36 kN/m) x 2250 lb/ft (33 kN/m)
Elongation (MD) x (TD)[2]	ASTM D6818	25 % x 20 %
UV Stability[2]	ASTM G154 / D4355 / D7328	100% (500hr) / 90% (3000hr)
Vegetation Establishment	ASTM D7322	552%

Table 3. Hydraulic Performance Properties

Property	Test Method	Value
Maximum Permissible Vegetated Shear Stress	ASTM D6460	12 psf (575 PA)
Maximum Permissible Vegetated Velocity	ASTM D6460	20 fps (6.1 m/s)
Permissible Vegetated Shear Stress @ 20-30% Coverage	ASTM D6460	4 psf (192 PA)
Permissible Vegetated Velocity @ 20-30% Coverage	ASTM D6460	8 fps (2.4 m/s)
Permissible Vegetated Shear Stress @ 60-70% Coverage	ASTM D6460	6 psf (287 PA)
Permissible Vegetated Velocity @ 60-70% Coverage	ASTM D6460	12 fps (3.7 m/s)
CFTRM	ASTM D6460	0.26
1) MARV/MIN 2)Typical		

Document # WE_EXCEL_PP5HD_ES. This document serves as an executive summary of material properties and performance thresholds. Additional information is available on Document # WE_EXCEL_PP5HD_SPEC, WE_EXCEL_PP5HD_PERF, WE_EXCEL_PP5HD_INL and WE_EXCEL_PP5HD_COC. Performance thresholds herein are provided as general guidance, site-specific evaluation should be conducted prior to application. Contact Western Excelsior for more information. Updated 8/2/16.

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