

ClosureTurf®

Impermeable Closure System

An impermeable closure system for long-term protection against erosion, ClosureTurf® combines a drainage system and geomembrane barrier with a durable synthetic turf. It can be used in a wide variety of applications, including embankments, waterways, landfills, mine spoils and hazardous sites. A quick and easy landfill cover to install, ClosureTurf® facilitates faster capping to reduce odors, improve gas collection efficiency, and enhance compliance with air quality rules.

Unlike traditional closure and erosion control systems, ClosureTurf® eliminates the need for protective soil cover and natural vegetation. It may also increase waste disposal capacity, which can result in significant savings. Once installed, ClosureTurf® is virtually maintenance-free: it doesn't require the mowing, watering and fertilizing of vegetative soil covers. It's extremely resistant to soil erosion and can even withstand hurricane-force winds.

50 mil SUPER GRIPNET®

Property	Test Method	LLDPE Values	HDPE Values
Thickness (min. avg.), mil (mm)	ASTM D5994	47 (1.2)	47 (1.2)
Thickness (lowest indiv.), mil (mm)	ASTM D5994	42.5 (1.06)	42.5 (1.06)
Drainage Stud Height (min. avg.), mil (mm)	ASTM D7466	130 (3.30)	130 (3.30)
Friction Spike Height (min. avg.), mil (mm)	ASTM D7466	175 (4.45)	175 (4.45)
Density, g/cc	ASTM D792, Method B	0.939 (max)	0.94 (min)
Tensile Properties (avg. both directions)	ASTM D6693, Type IV		
Strength @ Yield (min. avg.), lb/in width (N/mm)	ASTM D6693, Type IV	N/A	110 (19.3)
Elongation @ Yield (min. avg.), % (GL=1.3in)	ASTM D6693, Type IV	N/A 13	
Strength @ Break (min. avg.), lb/in width (N/mm)	ASTM D6693, Type IV	110 (19.3)	110 (19.3)
Elongation @ Break (min. avg.), % (GL=2.0in)	ASTM D6693, Type IV	300 200	
Tear Resistance (min. avg.), lbs. (N)	ASTM D1004	30 (133)	33 (169)
Puncture Resistance (min. avg.), lbs. (N)	ASTM D4833	55 (245)	80 (356)
Carbon Black Content (range in %)	ASTM D4218	2 - 3	2 - 3
Carbon Black Dispersion (Category)	ASTM D5596	Only near spherical agglomerates for 10 views: 9 views in Cat. 1 or 2, and 1 view in Cat. 3	
Stress Crack Resistance (Single Point NCTL), hours	ASTM 5397, Appendix	N/A	300
Oxidative Induction Time, minutes	ASTM D3895, 200°C, 1 atm O2	≥140	≥140
Melt Flow Index, g/10 minutes	ASTM D1238, 190°C, 2.16 kg	≤1.0	≤1.0
Oven Aging with HP OIT, (% retained after 90 days)	ASTM D5721 ASTM D5885, 150°C, 500 psi O2	60	80
UV Resistance with HP OIT, (% retained after 1600 hours)	ASTM D7238	20 hr. Cycle @ 75° C/4 hr. dark condensation @ 60°	
	ASTM D5885, 150°C, 500 psi O2	35	50
2% Secant Modulus (max), lb/in (N/mm)	ASTM D5323	3,000 (520)	N/A
Axi-Symmetric Break Resistance Strain, % (min)	ASTM D5617	30	N/A



Turf Component

Property	Test Method	Values
CBR Puncture	ASTM D6241	900 lb, (MARV)
Tensile Product (MD/XD)	ASTM D4595	1,000 lb/ft min (MARV)
Rainfall Induced Erosion	ASTM D96459	< 0.45% Infill Loss 6 in/hr
Aerodynamic Evaluation	GTRI Wind Tunnel	120 mph with maximum uplift of 0.12 lb/sf
DuraTurf™ Fiber UV Stability	ASTM G147	> 60% retained tensile strength at 100 years (projected)
Backing System UV Stability (Exposed)	ASTM G1545 Modified Cycle 1.UVA340	110 lbs/ft retained tensile strength at 6500 hours (projected)
Steady State Hydraulic Overtopping (ClosureTurf™with HydroBinder™)	ASTM D7277/D7276	5 ft overtopping resulting in 29 ft/s velocity and 8.8 psf shear stress for Manning N Value of 0.02
Full Scale Wave Overtopping Test	Colorado State University	165,000 ft3/ft
Cumulative Volume (ClosureTurf™ with HydroBinder™)	Wave Simulator	
Full Scale Wave Overtopping Test	Colorado State University	4.0 ft3/s/ft
Wave Overtopping Discharge(ClosureTurf™ with HydroBinder™)	Wave Simulator	
Transmissivity w/ underlying structured geomembrane Normal stress 50 psf and 0.33 gradient (m2/sec)	ASTM D4716	2.5E -03m2/sec., min.
Internal Friction of combined components	ASTM D5321	35°, min.
Sand Infill Gradation and Ballast	ASTM D6913	ASTM C-33 Fine Aggregates

ClosureTurf® Supply Information

[Standard Roll Dimensions]

	Length						Area (approx.)		Weight (av)
	mil	mm	ft	m	ft	m	ft2	m2	kg
Super Gripnet	50	1.25	23	7	300	91.44	6,900	640	1,300
Turf Component	N/A	N/A	15	4.6	300	91.44	4,500	418	381

Benefits of ClosureTurf®

- Reduces construction carbon footprint by up to 80%
- Rapid closure for odor control and gas management
- Lowers annual operation and maintenance costs
- Improves stability, erosion protection, emissions control and leachate reduction – even on steep slopes
- Delivers superior and reliable aesthetics
- Easy tie-in to base liner