



PEC-MAT[®]

TURF REINFORCEMENT MAT BY

GREENSTREAK[®]

PEC-MAT[®] is the permanent soft armor solution for many hard armor applications. PEC-MAT protects seed and soil during germination and provides long term turf-reinforcement for established vegetation. Its dense web design guards seed and soil from wind, rain and storm-water forces, while retaining moisture and solar energy to promote seedling development. The new vegetation's roots entwine with PEC-MAT to produce a reinforced turf capable of withstanding flow velocities up to 20 feet per second and a shear stress of 6 pounds per square foot.

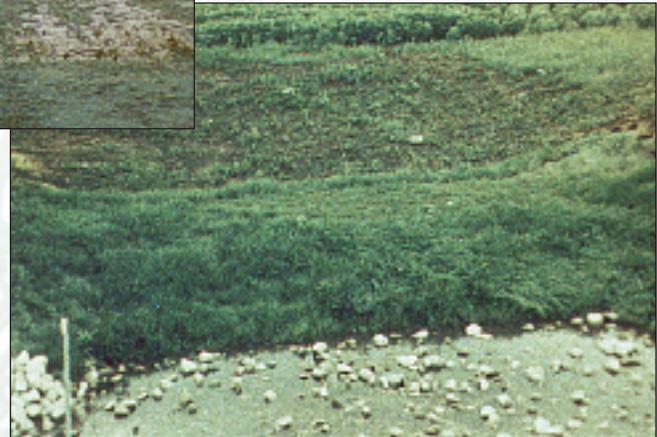
TYPICAL APPLICATIONS

- Roadway ditches
- Paved lot run-off ditches
- Pipe outlets and culverts
- Storm channels
- Irrigation channels
- Spillways
- Landfill covers



MATERIAL AND FORMULATION

- PEC-MAT is 100% synthetic, manufactured from thermally welded PVC monofilaments. It is highly flexible and will conform to irregularities in the grade for superior protection.
- Weighing 1.75 pounds per square yard and having a specific gravity of 1.37, PEC-MAT will not float or blow away.
- PEC-MAT is not biodegradable or toxic and is formulated with UV inhibitors to prevent photodegradation. It is unaffected by most agricultural chemicals and resistant to a wide pH range.
- Its high tensile modulus resists deformation and offers maximum root reinforcement.
- PEC-MAT's low roughness coefficient prevents turbulence and scouring while also reducing stake loading and deformation.
- Its unique green color offers immediate vegetated appearance.



MAT STRUCTURE AND ROLL SIZE

- PEC-MAT's unique, low profiled web structure places more filaments in direct contact with the ground for greater soil protection.
- No loose filaments within the mat.
- PEC-MAT requires no soil filling.
- Its porous structure allows groundwater recharge.
- Significantly wider than similar mats, PEC-MAT is available in 6 ft. rolls to reduce installation costs by limiting seams.

(800) 325-9504 / (636) 225-9400



TECHNICAL DATA

PROPERTY	TEST METHOD	UNIT	VALUE
Weight	ASTM D 3776	kg/m ² (oz./yd ²)	.95 (28)
Thickness	Measured	mm (in.)	2.54 (0.1)
Filament Diameter	Measured	mm (in.)	1.14 (0.045)
Porosity	CWD 02215-86	%	72
Width	Measured	m (ft.)	1.83 (6)
Length	Measured	m (ft.)	22.86 (75)
Area of Roll	Measured	m ² (yd ²)	41.8 (50)
Weight of Roll	Weighed	kg (lb.)	40 (90)

PHYSICAL PROPERTIES OF PEC-MAT: MINIMUM AVERAGE ROLL VALUES (MARV)

PROPERTY	TEST METHOD	UNIT	VALUE
Tensile Strength	ASTM D 4595-86	n/m (lb./in.)	
Length			640 (12)
Width			373 (7)
Elongation	ASTM D 4595-86	%	
Length			75
Width			75
Secant Tensile Modulus	ASTM D 4595-86	n/m (lb./in.)	
Length			1600 (30)
Width			800 (15)
Breaking Toughness	ASTM D 4595-86	m-pa (lb./in ²)	
Length			1050 (6)
Width			613 (3.5)
Conformity	ASTM D 1388-75	m/kgx10 ⁻⁴ (in./lb.x10 ⁻⁴)	
Length			2.79 (50)
Width			1.84(33)
Ultraviolet Stability			
QUV @ 2000 hr.	ASTM G 53-84	% prop. ret.	85
Weatherometer @ 1500 hr.	ASTM G 23-81	% prop. ret.	85
Low Temp. Brittleness	ASTM D 746	C (°F)	-37.2 (-35)
pH Range		pH	2-12
Heat Retention		j/m ² /C (BTU/ft ² /°F)	1430 (0.07)

HYDRAULIC PERFORMANCE OF PEC-MAT

PROPERTY	TEST METHOD	UNIT	VALUE
Manning Roughness Coefficient (N)	*		0.02
Max. Flow Velocity	*	m/sec. (ft./sec.)	6.1 (20)
Max. Recommended Shear Stress	**	pa (lb./ft ²)	287 (6)
Max. Stake Load		kg (lb.)	11.4 (25)

CHANNEL DESIGN

Channel carrying capacity should be calculated for a vegetated condition; the vegetated roughness coefficient "N" can vary from .03-.05 depending on depth of flow and type of vegetation.

Shear stress should be calculated for a non-vegetated condition using a roughness coefficient "N" of .02.

The following equations can assist in determining the carrying capacity and shear stress for a particular design and set of conditions:

$$Q = A \times V$$

Manning Equation for Velocity:

$$V = \frac{1.49(R)^{2/3}(S)^{1/2}}{N}$$

Equation for Hydraulic Radius:

$$R = \frac{A}{WP}$$

Equation for Hydraulic Gradient:

$$S = \frac{\text{Drop}}{\text{Channel Length}}$$

Equation for Shear Stress:

$$\tau = \gamma (D) (S)$$

Where:

A = Cross Section Area (sq. ft.)

D = Maximum Water Depth (sq. ft.)

N = Roughness Coefficient

Q = Carrying Capacity (cu.ft./sec.)

R = Hydraulic Radius (ft.)

S = Hydraulic Gradient (ft./ft.)

τ = Maximum Shear Stress (lb./sq.ft.)

V = Average Water Velocity (ft./sec.)

WP = Wetted Perimeter (ft.)

γ = Density of Water

*Flow tests conducted by Colorado State University using an 8 ft. wide x 4 ft. deep x 200 ft. long recirculating flume at flow rates up to 100 CFS. PEC-MAT showed no signs of failure at 20 ft./sec. - the maximum velocity of the flume.

**Maximum performance thresholds are accurate for short duration flows. Performance decreases as the duration increases. Shear stress is based on Texas Transportation Institute Channel Test findings.

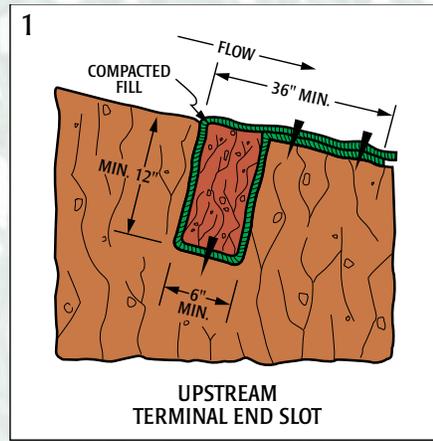
INSTALLATION

Site Preparation

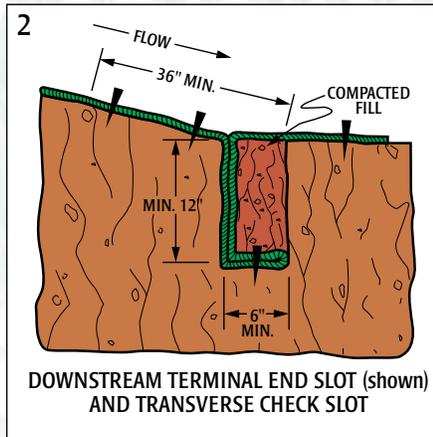
- If possible redirect run-off away from ditch or slope during installation.
- Grade surface of installation area, shaping and smoothing the soil. Fill in all holes with an appropriate fill material and compact.
- Trenches for terminal slots and check slots should be prepared perpendicular to the flow and a minimum of 6 in. wide x 12 in. deep. Width and depth to increase per design requirements of the project engineer based on specific project soil characteristics and conditions.
- Dress site by removing rocks, clods, stumps, debris, vehicle tracks or any protrusion which will prevent the mat from lying flush with the soil surface.
- Fertilize and seed before installing PEC-MAT.

Mat Installation

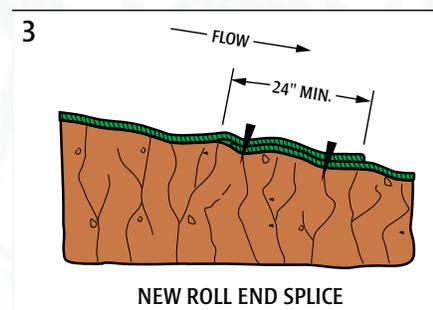
- In channel applications, center the first roll at the center-line of the channel. If additional rolls are required, overlap the new roll by minimum of 6 inches.
- Begin installing PEC-MAT at the upstream terminal slot and at the center of the site low point. Snugly fit and stake the mat into the bottom of the slot, back fill trench and compact with a tamper. (Illustration 1)
- Roll mat downstream, making sure it conforms to the surface and is not in tension.



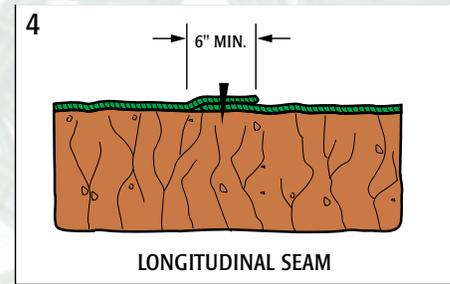
- Transverse check slots should be a minimum of 6 in. wide x 12 in. deep and located every 15 to 25 feet.
- Transverse check slots and downstream terminal end slots should be installed as shown in illustration 2. Double layer the mat snugly over the bottom and upstream wall of the slot, back fill and compact with a tamper.
- Always stake PEC-MAT at three locations across the bottom of any slot.



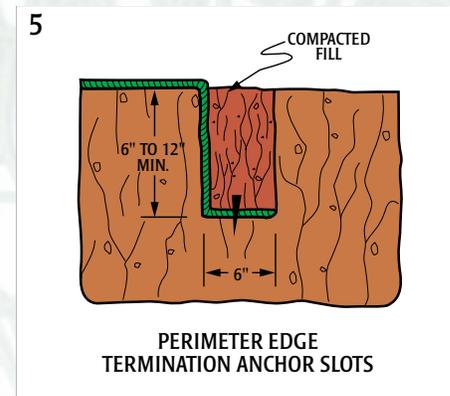
- When splicing a new roll that doesn't coincide with a transverse check slot, use a 2 ft. overlap and shingle downstream. (Illustration 3)



- Longitudinal seams should be shingled downstream and overlapped a minimum of 6 in. (Illustration 4)

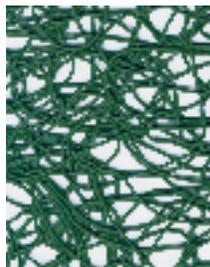


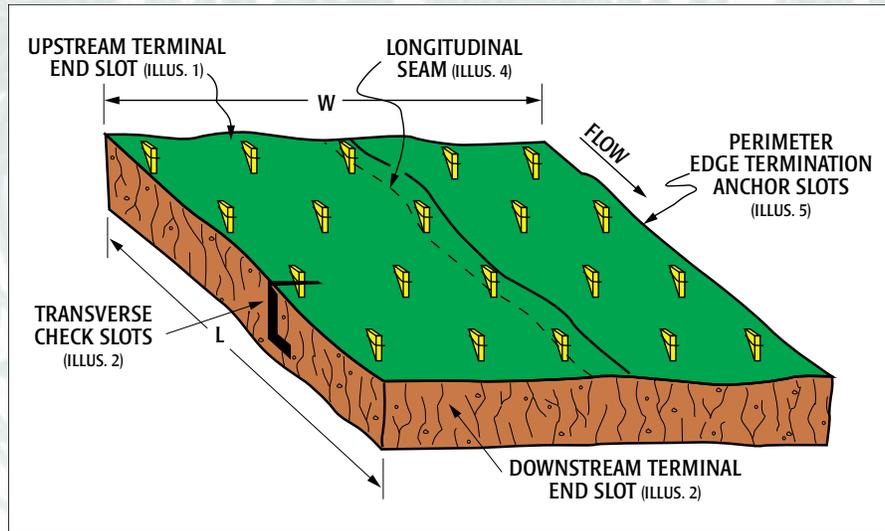
- Perimeter edges of all PEC-Mat installations should be terminated as shown in Illustration 5. Stake the mat at the bottom of the slot on 2 ft. centers.



Anchoring Options

- Staples should be 11 gauge steel and a minimum of 1 in. wide x 6 in. long.
- Steel Pins should be 3/16 in. diameter 18 in. long with a 2 in. diameter washer.
- Wooden stakes should be a nominal 1 in. x 4 in. triangular wooden survey stake and 10 to 12 in. in length. The 4 in. dimension should run parallel to the flow.
- The proper anchoring device should be determined by the project engineer based on soil type and water velocity.





ANCHOR SPACING

Anchor spacing is based upon 20 lb. per stake. If the stakes or staples pull out of the soil at a lower load, a denser pattern will be required.

Required Shear Stress (lb./ft ²)	Anchor Spacing	
	Across Flow (W)	With Flow (L)
0-1	3 ft.	6 ft.
1-2	3 ft.	3 ft.
2-3	2 ft.	3 ft.
3-6	2 ft.	2 ft.

AVAILABILITY

Greenstreak's PEC-MAT is available in the United States and internationally through our distribution and representative network. Please call us at 800-325-9504 or 636-225-9400 for information.

TECHNICAL SERVICES

Greenstreak engineers are available for consultation during design, specification and product installation. Please call 800-325-9504 or 636-225-9400 or visit www.greenstreak.com for product brochures, specification information, and technical assistance.

WARRANTY

Greenstreak warrants this product to be free from defects in material and workmanship when released from our factory. If this product is defective and our customer gives notice to Greenstreak before installing this product, Greenstreak will replace the product without charge to the customer or refund the purchase price at Greenstreak's election. Replacing the product or obtaining a refund are the buyer's sole remedy for a breach, and Greenstreak will not be liable for any consequential damage attributed to a defective product. Final determination of the suitability of this product for the use contemplated and its manner of use is the sole responsibility of the user.



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