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Type 5.E

Type 5.E – Paragraph Form

Product shall be ECTC Type 5.E, which is a turf reinforcement mat, composed of UV-stabilized non-degradable synthetic fibers, filaments, nets, wire mesh and/or other elements, processed into a permanent, three-dimensional matrix which may be supplemented with degradable components. Product un-vegetated permissible shear stress rating shall be $\geq 2.0 \text{ lbs/ft}^2$ ($\geq 96 \text{ Pa}$) according to ASTM D6460 large-scale testing or equivalent deemed acceptable by the engineer. Vegetated shear stress rating shall be $\geq 12.0 \text{ lbs/ft}^2$ ($\geq 575 \text{ Pa}$) according to ASTM D6460 large-scale testing or equivalent deemed acceptable by the engineer (for TRMs containing degradable components, property values must be obtained on the non-degradable portion of the matting alone). Large-scale performance testing typically involves limited soil types and vegetative stands, therefore it is recommended that an appropriate factor of safety be used in design and product selection (see Guidance Document for further information). Vegetation Establishment shall be PASS reflecting percentage improvement is $>100\%$ according to ASTM D7322. MD (Machine Direction) tensile strength shall be $\geq 1,500 \text{ lbs/ft}$ ($\geq 21.9 \text{ kN/m}$) x TD (Transverse Direction) tensile strength of $\geq 1,500 \text{ lbs/ft}$ ($\geq 21.9 \text{ kN/m}$) according to ASTM D6818 with property values obtained on the non-degradable portion of the matting alone and property values are reported as minimum average roll values (MARVs). Product shall have a mass per unit area of $\geq 8.0 \text{ oz/yd}^2$ ($\geq 271 \text{ g/m}^2$) according to ASTM D6566, thickness $\geq 0.25 \text{ in}$ ($\geq 6.35 \text{ mm}$) according to ASTM D6525 where thickness property value is reported as a MARV. Turf Reinforcement Mat UV-stability $\geq 90\%$ @ 1,000 hrs according to ASTM D4355 with property values obtained on the non-degradable portion of the matting alone. Typical values for Type 5.E TRMs are calculated as the average value. Statistically, it yields a 50% degree of confidence that any samples taken from quality assurance testing will exceed the value reported.

NOTE: TRMs are typically used in hydraulic applications, such as high flow ditches and channels, steep slopes, stream banks, and shorelines, where erosive forces may exceed the limits of natural, unreinforced vegetation or in areas where limited vegetation establishment is anticipated.



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Type 5.E

Type 5.E – Tabular Form

ECTC Type ^a	5.E
Product Description	Turf Reinforcement Mat
Material Composition	A product composed of UV-stabilized non-degradable synthetic fibers, filaments, nets, wire mesh and/or other elements, processed into a permanent, three-dimensional matrix which may be supplemented with degradable components
Un-vegetated Shear Stress ^{b, c, d}	$\geq 2.0 \text{ lbs/ft}^2 (\geq 96 \text{ Pa})$
Vegetated Shear Stress ^{c, d, e, f}	$\geq 12.0 \text{ lbs/ft}^2 (\geq 575 \text{ Pa})$
Vegetation Establishment (ASTM D7322) ^g	PASS
MD Material Tensile Strength (ASTM D6818) ^{d, f}	$\geq 1,500 \text{ lbs/ft} (\geq 21.9 \text{ kN/m})$
TD Material Tensile Strength (ASTM D6818) ^{d, f}	$\geq 1,500 \text{ lbs/ft} (\geq 21.9 \text{ kN/m})$
Mass Per Unit Area (ASTM D6566) ^d	$\geq 8.0 \text{ oz/yd}^2 (\geq 271 \text{ g/m}^2)$
Material Thickness (ASTM D6525) ^d	$\geq 0.25 \text{ in} (\geq 6.35 \text{ mm})$
UV Stability (ASTM D4355) ^{d, f}	$\geq 90\% @ 1000 \text{ hrs}$

a. For material Types 5.E and 5.F, property values tested per ASTM D6818 and ASTM D6525 are reported as minimum average roll values (MARVs). MARVs are calculated as the typical minus two standard deviations. Statistically, it yields a 97.7% degree of confidence that any samples taken from quality assurance testing will exceed the value reported.

b. Required minimum shear stress TRM (un-vegetated) can sustain without physical damage or excess erosion ($> 12.7 \text{ mm}$ (0.5 in.) soil loss during successive, minimum 30 minute flow events in large scale testing.

c. Acceptable large-scale testing protocol may include ASTM D6460, or other independent testing deemed acceptable by the engineer. Large-scale performance testing typically involves limited soil types and vegetative stands, therefore it is recommended that an appropriate factor of safety be used in design and product selection (see Guidance Document for further information).

d. Typical values are calculated as the average value, it yields a 50% degree of confidence that any samples taken from quality assurance testing will exceed the value reported.

e. Required minimum shear stress TRM (fully vegetated) can sustain without physical damage or excess erosion ($> 12.7 \text{ mm}$ (0.5 in.) soil loss during successive, minimum 30 minute flow events in large scale testing.

f. For TRMs containing degradable components, property values must be obtained on the non-degradable portion of the matting alone.

g. Vegetation establishment is reported as outlined in ASTM D 7322 as pass/fail. If the percentage germination improvement is $>100\%$, a pass is reported. If percent germination is $<100\%$, a fail is reported.



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