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Installation Guide for Rolled Erosion Control Products (RECPs) Including Mulch Control Nettings (MCNs), Open Weave Textiles (OWTs), Erosion Control Blankets (ECBs), and Turf Reinforcement Mats (TRMs)

This document is intended to provide general guidelines for the installation of RECPs and does not supersede manufacture's guidelines. The following sections summarize the general, accepted procedures for installation of RECPs and provide basic guidance for slope and channel installations. Detailed design/installation information should be obtained from the manufacturer.

General Procedure.

Prepare a stable and firm soil surface free of rocks and other obstructions. Apply soil amendments as necessary to prepare seedbed. Place fertilizer, water, and seed in accordance with manufacturer, local/state regulations, or engineer/specifiers requirements. Typically, RECPs are unrolled parallel to the primary direction of flow. Ensure the product maintains intimate contact with the soil surface over the entirety of the installation. Do not stretch or allow material to bridge over surface inconsistencies. Staple/stake RECPs to soil such that each staple/stake is flush with underlying soil. Install anchor trenches, seams and terminal ends as specified.

Install RECPs after application of seed, fertilizer, mulches (if necessary) and other necessary soil amendments, unless soil in-filling of the TRM is required. For TRMs if soil in-filling, install TRM, apply seed, and other soil amendments lightly brush or rake 0.3 to 0.7 in. (8 to 18 mm) of topsoil into TRM matrix to fill the product thickness. If in-filling with a hydraulically-applied matrix or medium is required; install TRM, then install hydraulically-applied matrix or medium at the manufacturer's suggested application rate.

Apply MCNs (Materials Type 1.A., 2.A., 3.A.) immediately after dry mulch application.

Anchor Trenches, Seams and Terminal Ends

(A) Upslope Anchor – utilize one of the methods detailed below for initial anchoring of RECPs

(1) Staples. Install the RECPs 3 ft. (900 mm) beyond the shoulder of the slope onto flat final grade. Secure roll end with a single row of stakes/staples on 1 ft. (300-mm) centers.

(2) Anchor trench. Excavate a 6 in. by 6 in. (150 mm by 150 mm) anchor trench. Extend the upslope terminal end of the RECPs 3 ft. (900 mm) past the anchor trench. Use stakes or staples to fasten the product into the bottom of the anchor trench on 1 ft. (300 mm) centers. Backfill the trench and compact the soil into the anchor trench. Apply seed and any necessary soil amendments to the compacted soil

and cover with remaining 1 ft. (300 mm) terminal end of the RECPs. Fold product over compacted soil in anchor trench to overlap downslope material. Secure terminal end of RECPs with a single row of stakes or staples on 1 ft. (300 mm) centers.

(3) Staple check. Construct a stake/staple check slot along the top edge of the RECPs by installing two rows of staggered stakes/staples 4 in. (100 mm) apart on 4 in. (100 mm) centers.

(4) Single net product anchor trench. Excavate a 6 in. by 6 in. (150 mm by 150 mm) anchor trench. Position roll such that the leading end of the roll is downslope and upside down. Apply seed and necessary soil amendments. Extend product 1 ft. downslope of anchor trench and place material in anchor trench (upside down). Secure terminal end and material in anchor trench with staples at 1 ft. intervals. Fill anchor trench with soil and compact. Apply seed and necessary soil amendments to fill placed in anchor trench. Move remaining roll over and downslope of anchor trench and proceed unrolling RECP downslope (since roll was initially reversed, folding material over anchor trench will result in the net side up, and rolling correctly downslope over the anchor trench).

(B) Seams – utilize one of the methods detailed below for seaming of RECPs

(1) Adjacent seams. Overlap edges of adjacent RECPs by 2 to 4 in. (50 to 100 mm) or by abutting products as defined by manufacturer. Use a sufficient number of stakes or staples to prevent seam or abutted rolls from separating.

(2) Consecutive rolls. Shingle and overlap consecutive rolls 2 to 6 in. (50 to 150 mm) in the direction of flow. Secure staples through seam at 1 ft. (300 mm) intervals.

(3) Check seam. Construct a stake/staple check seam along the top edge of RECPs for slope application and at specified intervals in a channel by installing two staggered rows of stakes/staples 4 in. (100 mm) apart on 4 in. (100 mm) centers.

(4) Slope interruption check slot. Excavate a trench measuring 6 in. wide by 6 in. deep (150 x 150 mm). Secure product to the bottom of the trench. Fold product over upslope material and fill and compact the trench on the downslope side of check slot and seed fill. Continue rolling material downslope over trench.

(C) Terminal Ends – utilize one of the methods detailed below for all terminal ends of RECPs

(1) Staples. Install the RECPs 3 ft. (900 mm) beyond the end of the channel and secure end with a single row of stakes/staples on 1 ft. (300-mm) centers. Stakes/staples for securing RECPS to the soil are typically 6 in. (150 mm) long.

(2) Anchor trench. Excavate a 6 in. by 6 in. (150 mm by 150 mm) anchor trench. Extend the terminal end of the RECPs 3 ft. (900 mm) past the anchor trench. Use stakes or staples to fasten the product into the bottom of the anchor trench on 1 ft. (300 mm) centers. Backfill the trench and compact the soil into the anchor trench. Apply seed and any necessary soil amendments to the compacted soil and cover with remaining 1 ft. (300 mm) terminal end of the RECPs. Secure terminal end of RECPs with a single row of stakes or staples on 1 ft. (300 mm) centers.

(3) Check slot. Construct a stake/staple check slot along the terminal end of the RECPs by installing two rows of staggered stakes/staples 4 in. (100 mm) apart on 4 in. (100 mm) centers.

Slope Installations.

At the top of slope, anchor the RECPs according to one of the method detailed in Section (A) above. Securely fasten all RECPs to the soil by installing stakes/staples at a minimum rate of 1.3/yd^2 (1.5/m^2) within the body of the blanket. For the most effective RECP installation use stake/staple patterns and densities as recommended by the manufacturer. For adjacent and consecutive rolls of RECPs follow seaming instructions detailed in Section (B) above. The terminal end of the RECPs installation must be anchored using one of the methods detailed in Section (C) above.

Channel Installations.

Construct an anchor trench at the beginning of the channel across its entire width according to Section (A) (2) above. Follow the manufacturer's installation guidelines in constructing additional anchor trenches or stake/staple check slots at intervals along the channel reach and at the terminal end of the channel, according to paragraph (A) above respectively. Unroll RECPs down the center of the channel in the primary water flow direction. Securely fasten all RECPs to the soil by installing stakes/staples at a minimum rate of 1.7/yd^2 (1.5/m^2). Significantly higher anchor rates and longer stakes/staples may be necessary in sandy, loose, or wet soils and in severe applications. For adjacent and consecutive rolls of RECPs follow seaming instructions detailed in Section (B) above. All terminal ends of the RECPs must be anchored using one of the methods detailed in Section (C) above.

With any RECP installation, ensure sufficient staples to resist uplift from hydraulics, wind, mowers, and foot traffic. For the most effective installation of RECPs, the ECTC recommends using stake/staple patterns and densities as recommended by the manufacturer.

Repair any damaged areas immediately by restoring soil to finished grade, re-applying soil amendments and seed, and replacing the RECPs.

Shoreline Installations.

When required, lower the waterline as necessary and construct an anchor trench at the top of slope as described in Section (A) (2). Unroll the product down the slope and follow the manufacturer's installation guidelines in constructing additional anchor trenches or stake/staple check slots at intervals along the shoreline. Construct an anchor trench just below the mean water line at the terminal end of the shoreline, according to paragraph (C) (2) above. Securely fasten all RECPs along the shoreline to the soil by installing stakes/staples at a minimum rate of 1.7/yd^2 (1.5/m^2) through the body of the rolled erosion control product. Significantly higher anchor rates and longer stakes/staples may be necessary in sandy, loose, or wet soils, below the waterline and in severe applications. For adjacent and consecutive rolls of RECPs follow seaming instructions detailed in Section (B) above.

ECTC Standard Specification For Temporary Rolled Erosion Control Products

For use where natural vegetation alone will provide sufficient permanent erosion protection.

ULTRA SHORT-TERM - Typical 3 month functional longevity.			**C Factor[b]**	**Shear Stress[c]**	**MD Material Tensile Strength**	**TD Material Tensile Strength**	**Material Thickness**	**Ground Coverage**	**Material Mass**	**Installed Slope Steepness[d]**
			Performance Test	**Performance Test**	**Typical**	**Typical**	**Typical**	**Typical**	**Typical**	**Maximum**
Type	**Product Description**	**Material Composition**			**ASTM D6818**	**ASTM D6818**	**ASTM D6525**	**ASTM D6567**	**ASTM D6475**	
1.A[a]	**Netting / Open Weave Textile**	*A photodegradable synthetic mesh or woven biodegradable natural fiber netting.*	≤ 0.10	≥ 1.0 lbs/ft^2 (48 Pa)	≥ 125 lbs/ft (1.8 kN/m)	≥ 10 lbs/ft (0.1 kN/m)	≥ 0.03 in (0.76 mm)	≥ 3 %	≥ 0.2 oz/yd^2 (7 g/m^2)	5:1 (H:V)
1.B	**Netless Rolled Erosion Control Blankets**	*Natural and/or polymer fibers mechanically interlocked and/or chemically adhered together to form an RECP.*	≤ 0.10	≥ 1.0 lbs/ft^2 (48 Pa)	≥ 125 lbs/ft (1.8 kN/m)	≥ 10 lbs/ft (0.1 kN/m)	≥ 0.30 in (≥ 7.6 mm)	≥ 50% - ≤ 90 %	≥ 10.0 oz/yd^2 (339 g/m^2)	3:1 (H:V)
1.C	**Single-net Erosion Control Blankets**	*Processed degradable natural and/or polymer fibers mechanically bound together by a single rapidly degrading, synthetic or natural fiber netting.*	≤ 0.10	≥ 1.5 lbs/ft^2 (72 Pa)	≥ 60 lbs/ft (0.9 kN/m)	≥ 20 lbs/ft (0.3 kN/m)	≥ 0.25 - ≤ 0.50 in (≥ 6.4 - ≤ 12.7 mm)	≥ 50% - ≤ 90 %	≥ 8.0 oz/yd^2 (271 g/m^2)	3:1 (H:V)
1.D	**Double-net Erosion Control Blankets**	*Processed degradable natural and/or polymer fibers mechanically bound together between two rapidly degrading, synthetic or natural fiber nettings.*	≤ 0.10	≥ 1.75 lbs/ft^2 (84 Pa)	≥ 75 lbs/ft (1.1 kN/m)	≥ 40 lbs/ft (0.6 kN/m)	≥ 0.25 - ≤ 0.50 in (≥ 6.4 - ≤ 12.7 mm)	≥ 50% - ≤ 90 %	≥ 8.0 oz/yd^2 (271 g/m^2)	2:1 (H:V)

SHORT-TERM - **Typical 12 month functional longevity.**			**C Factor[b]**	**Shear Stress[c]**	**MD Material Tensile Strength**	**TD Material Tensile Strength**	**Material Thickness**	**Ground Coverage**	**Material Mass**	**Installed Slope Steepness[d]**
Type	**Product Description**	**Material Composition**	**Performance Test**	**Performance Test**	**Typical**	**Typical**	**Typical**	**Typical**	**Typical**	**Maximum**
					ASTM D6818	**ASTM D6818**	**ASTM D6525**	**ASTM D6567**	**ASTM D6475**	
2.A[a]	**Netting / Open Weave Textile**	*A photodegradable synthetic mesh or woven biodegradable natural fiber netting.*	≤ 0.10	≥ 1.0 lbs/ft^2 (48 Pa)	≥ 125 lbs/ft (1.8 kN/m)	≥ 10 lbs/ft (0.1 kN/m)	≥ 0.03 in (≥ 0.76 mm)	≥ 3 %	≥ 0.2 oz/yd^2 (7 g/m^2)	5:1 (H:V)
2.B	**Netless Rolled Erosion Control Blankets**	*Natural and/or polymer fibers mechanically interlocked and/or chemically adhered together to form an RECP.*	≤ 0.10	≥ 1.0 lbs/ft^2 (48 Pa)	≥ 125 lbs/ft (1.8 kN/m)	≥ 10 lbs/ft (0.1 kN/m)	≥ 0.30 in (≥ 7.6 mm)	≥ 50% - ≤ 90 %	≥ 10.0 oz/yd^2 (339 g/m^2)	3:1 (H:V)
2.C	**Single-net Erosion Control Blankets**	*Processed degradable natural and/or polymer fibers mechanically bound together by a single degrading, synthetic or natural fiber netting.*	≤ 0.10	≥ 1.5 lbs/ft^2 (72 Pa)	≥ 60 lbs/ft (0.9 kN/m)	≥ 20 lbs/ft (0.3 kN/m)	≥ 0.25 - ≤ 0.50 in (≥ 6.4 - ≤ 12.7 mm)	≥ 50% - ≤ 90 %	≥ 8.0 oz/yd^2 (271 g/m^2)	3:1 (H:V)
2.D	**Double-net Erosion Control Blankets**	*Processed degradable natural and/or polymer fibers mechanically bound together between two degradable, synthetic or natural fiber nettings.*	≤ 0.10	≥ 1.75 lbs/ft^2 (84 Pa)	≥ 75 lbs/ft (1.1 kN/m)	≥ 40 lbs/ft (0.6 kN/m)	≥ 0.25 - ≤ 0.50 in (≥ 6.4 - ≤ 12.7 mm)	≥ 50% - ≤ 90 %	≥ 8.0 oz/yd^2 (271 g/m2)	2:1 (H:V)

EXTENDED-TERM - **Typical 24 month functional longevity.**			**C Factor**[b]	**Shear Stress**[c]	**MD Material Tensile Strength**	**TD Material Tensile Strength**	**Material Thickness**	**Ground Coverage**	**Material Mass**	**Installed Slope Steepness**[d]
Type	**Product Description**	**Material Composition**	**Performance Test**	**Performance Test**	**Typical** **ASTM D6818**	**Typical** **ASTM D6818**	**Typical** **ASTM D6525**	**Typical** **ASTM D6567**	**Typical** **ASTM D6475**	**Maximum**
3.A	**Open Weave Textiles**	*An open weave textile composed of processed slow degrading natural or polymer yarns or twines woven into a continuous matrix.*	≤ 0.05	≥ 2.0 lbs/ft^2 (96 Pa)	≥ 100 lbs/ft (1.5 kN/m)	≥ 40 lbs/ft (0.6 kN/m)	≥ 0.20 - ≤ 0.40 in (≥ 5.1 - ≤ 10.1 mm)	≥ 40 %	≥ 11.0 oz/yd^2 (373 g/m^2)	2:1 (H:V)
3.B	**Erosion Control Blankets**	*An erosion control blanket composed of processed slow degrading natural or polymer fibers mechanically bound together between two slow degrading synthetic or natural fiber nettings to form a continuous matrix.*	≤ 0.05	≥ 2.0 lbs/ft^2 (96 Pa)	≥ 100 lbs/ft (1.5 kN/m)	≥ 40 lbs/ft (0.6 kN/m)	≥ 0.25 - ≤ 0.50 in (≥6.4 - ≤ 12.7 mm)	≥ 50% - ≤ 95 %	≥ 8.0 oz/yd^2 (271 g/m^2)	1.5:1 (H:V)

LONG-TERM - Typical 36 month functional longevity.			**C Factor[b]**	**Shear Stress[c]**	**MD Material Tensile Strength**	**TD Material Tensile Strength**	**Material Thickness**	**Ground Coverage**	**Material Mass**	**Installed Slope Steepness[d]**
			Performance Test	**Performance Test**	**Typical**	**Typical**	**Typical**	**Typical**	**Typical**	**Maximum**
Type	**Product Description**	**Material Composition**			**ASTM D6818**	**ASTM D6818**	**ASTM D6525**	**ASTM D6567**	**ASTM D6475**	
4.A	**Open Weave Textiles**	*An open weave textile composed of processed slow degrading natural or polymer yarns or twines woven into a continuous matrix.*	≤ 0.05	≥ 2.25 lbs/ft^2 (108 Pa)	≥ 100 lbs/ft (1.5 kN/m)	≥ 40 lbs/ft (0.6 kN/m)	≥ 0.20 - ≤ 0.40 in (≥ 5.1 - ≤ 10.1 mm)	≥ 50 %	≥ 20.0 oz/yd^2 (678 g/m^2)	1:1 (H:V)
4.B	**Erosion Control Blankets**	*An erosion control blanket composed of processed slow degrading natural or polymer fibers mechanically bound together between two slow degrading synthetic or natural fiber nettings to form a continuous matrix.*	≤ 0.05	≥ 2.25 lbs/ft^2 (108 Pa)	≥ 100 lbs/ft (1.5 kN/m)	≥ 40 lbs/ft (0.6 kN/m)	≥ 0.20 - ≤ 0.50 in (≥ 5.1 - ≤ 12.7 mm)	≥ 50% - ≤ 95 %	≥ 8.0 oz/yd^2 (271 g/m^2)	1:1 (H:V)

a. C Factor and permissible shear stress for Types 1.A. and 2.A. mulch control nettings must be obtained with netting used in conjunction with pre-applied mulch material.

b. This value should be the maximum C Factor from standardized large-scale rainfall performance testing, ASTM D6459 or equivalent deemed acceptable by the engineer.

c. Required minimum shear stress RECP (unvegetated) can sustain without physical damage or excess erosion (> 12.7 mm (0.5 in) soil loss) during a 30-minute flow event in large-scale performance testing, ASTM D6460 or equivalent deemed acceptable by the engineer.

d. This value should represent the maximum gradient the product should be recommended for rainfall/slope application.

Table 2. ECTC Standard Specification For Turf Reinforcement Mats (TRMs) (updated January 2025)

For applications where vegetation alone will not sustain expected flow conditions and/or provide sufficient long-term erosion protection.

							Index Value at Time of Manufacture				
Type	**Product Description**	**Material Composition**	**Slope Application Maximum Gradient**	**Performance Test Unvegetated Shear Stress [b, c, d] Typical ASTM D6460**	**Performance Test Vegetated Shear Stress [c, d, e, f] Typical ASTM D6460**	**Vegetation Establishment [g] ASTM D7322**	**Tensile Strength MD [d, f] Typical ASTM D6818**	**Tensile Strength TD [d, f] Typical ASTM D6818**	**Material Mass / Unit Area [d] Typical ASTM D6566**	**Thickness [d] Typical ASTM D6525**	**UV Stability [d, f] Typical ASTM D4355**
5.A	**Turf Reinforcement Mat**	*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.*	1:1 (H:V)	≥ 2.0 lb/ft² (≥ 96 Pa)	≥ 6.0 lb/ft² (≥ 287 Pa)	PASS	≥ 150 lbs/ft (≥ 2.2 kN/m)	≥ 150 lbs/ft (≥ 2.2 kN/m)	≥ 8.0 oz/yd² (≥ 271 g/m2)	≥ 0.25 in (≥ 6.35 mm)	≥ 80% @ 500 hrs
5.B	**Turf Reinforcement Mat**		1:1 (H:V)	≥ 2.0 lb/ft² (≥ 96 Pa)	≥ 8.0 lb/ft² (≥ 383 Pa)	PASS	≥ 175 lbs/ft (≥ 2.6 kN/m)	≥ 175 lbs/ft (≥ 2.6 kN/m)	≥ 8.0 oz/yd² (≥ 271 g/m2)	≥ 0.25 in (≥ 6.35 mm)	≥ 80% @ 500 hrs
5.C	**Turf Reinforcement Mat**		0.5:1 (H:V)	≥ 2.0 lb/ft² (≥ 96 Pa)	≥ 10.0 lb/ft² (≥ 479 Pa)	PASS	≥ 200 lbs/ft (≥ 2.9 kN/m)	≥ 200 lbs/ft (≥ 2.9 kN/m)	≥ 8.0 oz/yd² (≥ 271 g/m2)	≥ 0.25 in (≥ 6.35 mm)	≥ 80% @ 1,000 hrs
5.D	**Turf Reinforcement Mat**		0.5:1 (H:V)	≥ 2.0 lb/ft² (≥ 96 Pa)	≥ 12.0 lb/ft² (≥ 575 Pa)	PASS	≥ 325 lbs/ft (≥ 4.8 kN/m)	≥ 225 lbs/ft (≥ 3.3 kN/m)	≥ 8.0 oz/yd² (≥ 271 g/m2)	≥ 0.25 in (≥ 6.35 mm)	≥ 80% @ 1,000 hrs
5.E [a]	**Turf Reinforcement Mat**		0.5:1 (H:V)	≥ 2.0 lb/ft² (≥ 96 Pa)	≥ 12.0 lb/ft² (≥ 575 Pa)	PASS	≥ 1,500 lbs/ft (≥ 21.9 kN/m)	≥ 1,500 lbs/ft (≥ 21.9 kN/m)	≥ 8.0 oz/yd² (≥ 271 g/m2)	≥ 0.25 in (≥ 6.35 mm)	≥ 90% @ 1,000 hrs
5.F [a]	**High Performance Turf Reinforcement Mat**	*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.*	0.5:1 (H:V)	≥ 2.0 lb/ft² (≥ 96 Pa)	≥ 14.0 lb/ft² (≥ 670 Pa)	PASS	≥ 3,000 lbs/ft (≥ 43.8 kN/m)	≥ 3,000 lbs/ft (≥ 43.8 kN/m)	≥ 8.0 oz/yd² (≥ 271 g/m2)	≥ 0.25 in (≥ 6.35 mm)	≥ 80% @ 3,000 hrs

[a] For material Types 5.E and 5.F, property values tested per ASTM D6818 and 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 (unvegetated) can sustain without physical damage or excess erosion (> 12.7 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. Statistically, 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 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 percent germination improvement is >100%, a pass is reported. If percent germination is ≤100%, a fail is 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.

[d] *Typical values 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.*

[e] *Required minimum shear stress TRM (fully vegetated) can sustain without physical damage or excess erosion (> 12.7 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.*

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 natura, unreinforced vegetation or in areas where limited vegetation establishment is anticipated.