STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATION 836
SEEDING AND EROSION CONTROL WITH
TURF REINFORCING MAT
April 15, 2005

836.01 Description. This work consists of furnishing, placing and maintaining seeding and erosion control with turf reinforcing mat on areas shown on the plans.

836.02 Materials. For mat Type 1, Type 2, and Type 3 furnish a flexible mat of, non-biodegradable polymer monofilament yarns bonded together to form a stable three-dimensional web. Straw, coconut fiber, or other biodegradable materials may be intertwined with mat Type 1.

Furnished mats conforming to the following:

A. Permeable.

B. The non-biodegradable component is resistant to chemical, environmental and ultraviolet degradation.

The following Minimum Average Roll Values (MARV) for physical properties are derived from quality control testing performed by a GAI-LAP accredited laboratory:

Property	Test Method	Type 1	Type 2	Type 3
Ground Cover Factor (2) (percent, minimum)	ECTC	40	50	60
Mass per Unit Area(2) (oz/yd^2 [g/m^2] minimum)	ASTM D 6566	8[270]	10[340]	14[475]
Thickness (mils. [mm], minimum)	ASTM D 6525, at 2 kPa	120 [3.05]	500 [12.7]	500 [12.7]
Tensile Strength(1) (lb/ft [kN/m], minimum)	ASTM D 5035	145 X 110 [2.1 X 1.6]	165 X 123 [2.4 X 1.8]	210 X 60 [3.0 X 2.3]
Ultraviolet Resistance (percent, minimum)	ASTM D 4355, 500 hours total exposure	80	80	80

(1) Machine Direction X Cross Direction
(2) Light Penetration Test, The biodegradable portion for mat type1 is include in the test. Mat type 1 is not required to have a biodegradable portion.

Perform testing for physical properties at frequencies exceeding ASTM D 4354, Procedure B, with a lot defined as the lesser of the manufacturer's planned production quantity and one calendar day's production.

Furnish mats meeting the following permissible design values when tested at an independent hydraulics testing facility for a minimum of 0.5 hours on an unvegetated erodible soil bed of sand or firm loam.

Property	**Type 1**	**Type 2**	**Type 3**
Velocity Resistance (fps[m/sec],minimum)	5 [1.5]	8.5 [2.6]	12 [3.6]
Shear Stress Resistance (lb/ft^2 [kN/m^2], minimum)	2 [.100]	3 [.144]	5 [.240]
Soil Loss (in. [mm])	1 [25]	1 [25]	1 [25]

Furnish mats meeting the following permissible design values when tested at an independent hydraulics testing facility for a minimum of 0.5 hours on a vegetated, erodible soil bed of sand or firm loam.

Property	**Type 1**	**Type 2**	**Type 3**
Velocity Resistance (fps[m/sec],minimum)	8 [2.5]	13 [4]	18 [5.5]
Shear Stress Resistance (lb/ft^2 [kN/m^2], minimum)	3 [.140]	5 [.240]	8 [.380]
Soil Loss (in. [mm])	1 [25]	1 [25]	1 [25]

Ship and store the mats such that they are protect from direct sunlight, dirt, dust, moisture and other debris.

Furnish pins or staples conforming to 671.02. The Contractor may use 18 inch [450 mm] pins, ¼ inch [4.5 mm] diameter, with attached 1½ inch [38 mm] washers in lieu of 12 inch (300mm) wire staples as fasteners. Drive pins only until the attached washer is flush with the ground surface.

Furnish material according to the Departments Qualified Products List (QPL).

Supply recommended installation procedures with each roll of mat delivered to the job site.

Furnish seed conforming to 659.

836.03 Construction. Prior to placement of the mat, prepare the seed area, lime, fertilize, and seed according to Item 659, with the following exceptions:

A. Remove all rock, clods and foreign material 1½ inch [38 mm] or greater in size from the surface to be covered.

B. Do not apply mulch prior to placement of the mat.

Place the mat according to 671.03.A, with the following exceptions and additions:

2. Begin installation at the downstream terminal end trench 12 inches [300 mm] deep by 6 inches [150 mm] wide. Place mat in bottom of trench with roll of material on downstream side of the trench. After pinning mat securely in bottom of trench, backfill the trench and compact firmly. Roll mat across backfill and upstream.

4. Construct upstream termination by rolling mat through the terminal end trench, 12 inches [300 mm] by 6 inches [150 mm], being sure to allow sufficient amount of mat to cover backfilled trench. After pinning mat in bottom of trench, backfill the trench and compact firmly. Roll remaining mat back downstream across backfill and pin in place.

7. In addition construct top of channel bank termination by rolling mat through a top anchor trench, 12 inches [300 mm] by 6 inches [150 mm], being sure to allow sufficient amount of mat to cover the backfilled trench. After pinning mat in bottom of trench, backfill the trench and compact firmly.

9. For mat Types 1, 2, and 3, after installation of the mat, re-seed the mats with the mixture and at the rate specified in 659 or on the plans. If required in the plans soil fill the mat type 2 or 3. Soil fill by raking and smoothing fine topsoil into the turf reinforcing mat to completely fill its thickness. Do not leave excessive soil above the matting. Apply mulch to mat type 1 after placement. Apply mulch to mat types 2 and 3 after soil filling if required or after placement.

836.04 Maintenance. Maintain the area covered by seeding and erosion control with turf reinforcing mat according to 671.04.

836.05 Method of Measurement. The Department will measure the mat by the number of square yards [square meters] of surface area completed and accepted.

836.06 Basis of Payment. The Department will pay for preparing the area, liming, fertilizing, seeding, and mulching under Item 659. The Department will pay for the mat and re-seeding with any required soil filling under Item 836.

The Department will pay for accepted quantities at the contract prices as follows:

Item	Unit	Description
836	Square yard [square meter]	Seeding and erosion control with turf reinforcing mat, Type _____.
836	Square yard [square meter]	Seeding and erosion control with turf reinforcing mat, Type _____, without soil-filling.

Designer Note:

This supplemental specification will be used in ditch design for velocity protection. SS 836 may be used when the ditch slope is less than 10 percent and maximum velocities exceed those allowed for Seed, Sod, or Ditch Erosion Protection as shown in Table 1102-1 of the Location and Design Manual. For ditch velocities shown in Section 1102.3.2.A of the manual, the materials specified in SS 836 provide viable alternatives to Rock Channel Protection.