

Flexamat 10NW UV-T Specification

1. DESCRIPTION

A Tied Concrete Block Mat manufactured with a UV stabilized interlocking geogrid with a 10oz non-woven geotextile underlayment cast and adhered to the back of the blocks.

This work shall consist of furnishing and placing the system in accordance with this specification and conforming with the lines, grades, design, and dimensions shown on the plans.

2. MATERIALS

Flexamat 10NW UV-T are manufactured from individual concrete blocks tied together with high strength UV resistant knitted polypropylene bi-axial geogrid. Each block is tapered, beveled and interlocked and includes connections that prevent lateral displacement of the blocks within the mats when they are lifted for placement.

Tied Concrete Block Mat with 10oz non-woven geotextile underlayment shall be Flexamat 10NW UV-T, manufactured by Motz Enterprises, Inc.

- 2.1. **Blocks.** Furnish blocks manufactured with concrete conforming to the cement requirements of ASTM C150 and to the aggregate requirements of ASTM C33. Furnish blocks that have a minimum weight of 3 lbs. per block and placed no further than 2 in. apart. Material shall have a weight per square foot not exceeding 10 lbs. Blocks shall have a 2.25" profile, a flat-top pyramid shape, and a coarse finish without protrusions. Concrete shall have a minimum compressive strength requirement of Table 1 and certified by a third party.

**Table 1
Concrete Compressive Strength Requirements**

Age	Required Compressive Strength psi
28 - Day	5000 psi

- 2.2. **Polypropylene Bi-Axial Geogrid.** The interlocking geogrid shall be composed of polypropylene multifilament yarns knitted in tension and designed to resist degradation in environments with exposure to ultra-violet light, water and low pH (<4 pH) and high pH (>9 pH). Carbon black UV inhibitor shall be blended into the extruded yarns at a rate no less than 0.8% by weight and the knitted geogrid shall be coated with an initial coating to independently achieve a maximum Tensile Strength loss of 8% at 500 hours when tested in accordance with ASTM D4355. The geogrid shall then be subsequently coated with a high ultra-violet resistant synthetic rubber blend coating with a tan color (for identification). When combined with the revetment mat, this will yield a durable, high tenacity, low elongating, and continuous filament polypropylene fibers that is securely cast into and embedded within the base of the concrete blocks and obtains connection strength greater than that of the geogrid. Ensure the geogrid meets physical and ultra-violet resistance requirements of Table 2.

**Table 2
Polypropylene Bi-Axial Geogrid Requirements**

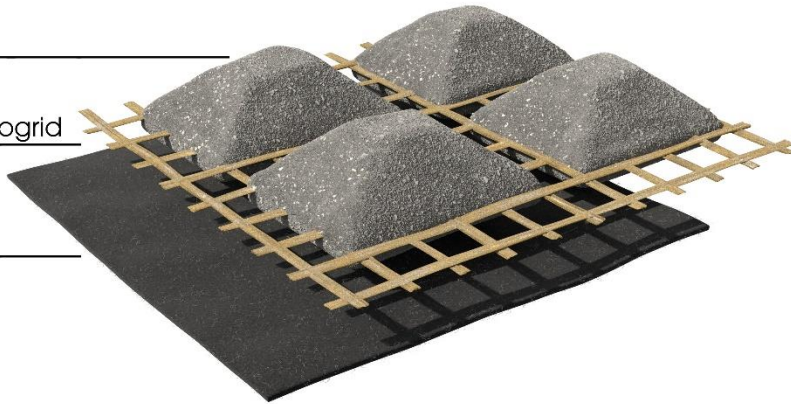
Property	Unit	Test	Requirement
Mass/Unit Area	oz/yd ²	ASTM D5261	6.5 oz/yd ²
Aperture Size	English units	Measured	1.4x 1.4 inch
Ultimate Wide Width Tensile Strength (MD x CMD)	lb/ft	ASTM D6637	2,055 lb/ft
Elongation at Ultimate Tensile Strength (MD x CMD)	%	ASTM D6637	≤ 8%
Wide Width Tensile Strength @ 2% (MD x CMD)	lb/ft	ASTM D6637	822 lb/ft
Wide Width Tensile Strength @ 5% (MD x CMD)	lb/ft	ASTM D6637	1,640 lb/ft
Tensile Modulus @ 2% (MD x CMD)	lb/ft	ASTM D6637	41,100 lb/ft
Tensile Modulus @ 5% (MD x CMD)	lb/ft	ASTM D6637	32,800 lb/ft
UV Resistance (4000hr)	% retained/hr	ASTM G154	100% Retained Strength
UV & Water Resistance (4000 hr)	% retained/hr	ASTM D 4355	100% Retained Strength
Color	Color Chart	Visual	Tan

- 2.3. **Geotextile Underlayment** – Mats shall have a 10oz non-woven geotextile cast onto the back of the blocks, adhering to the back of each concrete block. Puncturing holes through the 10oz non-woven geotextile to hog ring or tie through other means to the Tied Concrete Mat is unacceptable. The 10oz non-woven geotextile shall not be installed separately or loosely under the Tied Concrete Block Mat. Each block shall be cast to and adhered to the 10oz. non-woven geotextile consisting of the following properties:

5000 PSI Concrete Blocks

UV-T High Strength Biaxial Geogrid

10oz. Non-woven Geotextile



Property	Test Method	English	Metric
Weight - Typical	ASTM D-5261	10 oz/sy	339 g/sm
Tensile Strength	ASTM D-4632	250 lbs	1,112 N
Elongation @ Break	ASTM D-4632	50%	50%
Mullen Burst*	ASTM D-3786*	500 psi	3,447 kPa
Puncture Strength*	ASTM D-4833*	155 lbs	690 N
CBR Puncture	ASTM D-6241	700 lbs	3,115 N
Trapezoidal Tear	ASTM D-4533	100 lbs	444 N
Apparent Opening Size	ASTM D-4751	100 US Sieve	0.150 mm
Permittivity	ASTM D-4491	1.20 Sec-1	1.20 Sec-1
Water Flow Rate	ASTM D-4491	80 g/min/sf	3,251 l/min/sm
UV Resistance @ 500 Hours	ASTM D-4355	70%	70%

- 2.4. **Geogrid and 10oz Non-Woven Geotextile Extensions.** Mats shall have an 8” extension of the polypropylene UV bi-axial geogrid and an 8” extension of the 10oz. non-woven geotextile extending along the long length of one edge of the mat. The geogrid and underlayment extension are an overlap for the subsequent mat to be installed over.
- 2.5. Cover the Flexamat 10NW UV-T rolls or otherwise protect it during long periods of storage to protect against degradation of the backing material as recommended by the manufacturer.
- 2.6. Flexamat 10NW UV-T rolls will be rolled for shipment and are packaged with lifting straps.

All mats to be inspected upon delivery. Assure that all units are sound and free of defects that would interfere with the proper placing of the unit or impair the strength or permanence of the construction.

Chipping or missing concrete resulting in a weight loss exceeding 15% of the average weight of a concrete unit is grounds for rejection by the engineer. Replace, repair or patch the damaged areas per the manufacturer's recommendations.

3. PERFORMANCE

Full-Scale laboratory testing performed by an independent 3rd party testing facility with associated engineered calculations certifying the hydraulic capacity of the proposed Tied Concrete Block Mat meets the following requirements:

Test	Tested Value	Bed Slope	Soil Classification	Limiting Value
ASTM 6460	Shear Stress	30%	Sandy Loam (USDA)	24lb./ft ²
ASTM 6460	Velocity	20%	Loam (USDA)	30 ft./sec

4. ALTERNATIVE PRODUCTS

Such products must be pre-approved in writing by the Engineer prior to bid date. Alternative product packages must be submitted to the Engineer a minimum of fifteen (15) days prior to bid date. Submittal packages for alternate products must include, as a minimum, the following:

- 4.1. Alternative Product Properties – Product must be comprised of materials as detailed in Section 2, including both in composition, underlayment layers and performance requirements.

- 4.2. Full-Scale laboratory testing performed by an independent 3rd party testing facility with associated engineered calculations certifying the hydraulic capacity of the proposed Tied-Concrete Block Erosion Control Mat meets the performance requirements listed in Section 3 of this specification.
- 4.3. A list of 15 comparable projects in terms of project size, application and material dimensions in the United States, where the results of the specific alternative material's use can be verified and reviewed for system integrity and sustained after a minimum of 10 years of service life.

5. EQUIPMENT

Provide the proper equipment to place the mat that will not damage the mat material or disturb the subgrade.

6. CONSTRUCTION

Prior to installing Flexamat 10NW UV-T, prepare the subgrade as detailed in the plans. All subgrade surfaces to be smooth and free of rocks, roots, debris, or other protrusions that would prevent intimate contact between the block and the subgrade. When seeding is shown on the plans, provide subgrade material that can sustain growth.

Ensure the prepared subgrade provides a smooth, firm, and unyielding foundation for the mats.

Install mats to the line and grade shown on the plans and per the manufacturer's guidelines. Mats shall be continuous in length from past the crest of the levee to past the toe of the levee, without any seams or overlaps within the mat on the vertical running slope.

Provide a minimum 24 in. deep mat embedment toe trench at all edges exposed to concentrated flow.

Install fastening or anchoring as recommended by the manufacturer or engineer for the site conditions.

7. MEASUREMENT

This Item will be measured by the square footage used, complete in place.

8. PAYMENT

The work performed, and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for Flexamat 10NW UV-T. This price is full compensation for loading and transporting, placing concrete block mats; excavation and disposal; and bedding; and equipment, labor, materials, tools, and incidentals.