



Republic of the Philippines  
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS  
**OFFICE OF THE SECRETARY**  
Bonifacio Drive, Port Area Manila



097.13 DPWH  
02.06.2025

JAN 28 2025

DEPARTMENT ORDER )

**SUBJECT: Specification on the Use of  
Item 519 – Web Composite Mats**

NO. 27 )  
Series of 2025 )

dn 2/6/2025

In line with the continuing efforts to upgrade construction technology thru the adoption of successful research studies, this Department Order has approved the use of **Web Composite Mats** as slope protection, subject to the specifications hereto attached. A Certificate of Conditional Approval (CCA) has been issued by this Department, accrediting the use of Web Composite Mats in DPWH projects from **January 7, 2025 to January 6, 2030.**

This Item will be conditionally included in the Project and Contract Management Application (PCMA) for ready use in various DPWH projects until the date of expiration of the CCA.

This Order shall take effect immediately.

  
**MANUEL M. BONOAN**  
Secretary

Department of Public Works and Highways  
Office of the Secretary  
  
WIN5U02100

Encl: (1) Specification on the Use of Item 519 – Web Composite Mats  
(2) Certificate of Conditional Approval

14.1.2 JDV/AGC

Website: <https://www.dpwh.gov.ph>  
Tel. No(s).: 5304-3000 / (02) 165-02



## Specification on the Use of Item 519 – Web Composite Mats

### 519.1 Description

This item shall consist of furnishing, placing, and installing Web Composite Mats in accordance with this Specification and in conformity with the lines, grades, dimensions, and arrangements shown on the Plans or as directed by the Engineer.

Web composite mats are high porosity non-woven fabric erosion control mat made of crimped polyester fiber with natural vegetation function used for ditch and slope protection. The mats feature a random arrangement of water-repellent ultrafine fibers that are similar to the capillary roots on plants. The non-woven fabric structure (web) is highly porous, allowing air and water to pass through freely. These mats protect the soil from various environmental changes (rain, wind, drought, etc.).

### 519.2 Material Requirements

#### 519.2.1 Web Composite Mat

Web Composite Mat shall conform to the composition as shown in Tables 519.1, 519.2 and 519.3.

**Table 519.1 Web Composite Mat Requirements for Type 1 and Type 2**

Property	Requirement		Test Method
	Type 1	Type 2	
Color Protective Net <sup>1</sup> Web <sup>2</sup> Wire Net	Moss Green Dark Gray -	Moss Green Dark Gray Silvery Metallic Color	Visual
Thickness, mm	1 - 3	1 - 3	ASTM D1777
Tensile Strength Machine Direction, kN/m	1.5 - 4.0	5.0 - 8.0 <sup>3</sup>	ASTM D6818/ ASTM D4595
Mass/Unit Area g/sq.m	70 - 100	300 - 350	ASTM D6566/ ASTM D5261
UV Stability, %, Min.	90	90	ASTM D4355
Water Holding Capacity, %	1,500 - 3000	350 - 550	ASTM D7367
Light Penetration, %	15 - 35	10 - 30	ASTM D6567
Wire Net Reinforcement	-	Zinc Coated, Galvanized Iron Wire	ASTM A1007
Thickness of Wire, mm	-	0.5-0.9	
C Factor, Max.	0.02	0.02	ASTM D 6459

Notes: ASTM D1777 – Standard Test Method for Thickness of Textile Materials

ASTM D6818 – Standard Test Method for Ultimate Tensile Properties of Rolled Erosion Control Products

ASTM D4595 – Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method

ASTM D6566 – Standard Test Method for Measuring Mass per Unit Area of Turf Reinforcement Mats

ASTM D5261 – Standard Test Method for Measuring Mass per Unit Area Geotextiles

ASTM D4355 – Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon-Arc Type Apparatus

*ASTM D7367 – Standard Test Method for Determining the Light Penetration and Sediment Retention of Rolled Erosion Control Products (RECPs)*

*ASTM D6567 – Standard Test Method for Measuring the Light Penetration of Turf Reinforcement Mats (TRMs)*

*ASTM A1007 - Standard Specification for Carbon Steel Wire for Wire Rope*

*ASTM D6459 – Standard Test Method for Determination of Resistance of Rolled Erosion Control Products (RECPs) to Rainfall-Induced Erosion*

*1 – polyethylene resin*

*2 – non-woven fabric made of crimped polyester fiber*

*3 – testing shall include wire net*

**Table 519.2 Web Composite Mat Requirements for Type 3 and Type 4**

Property	Requirement		Test Method
	Type 3	Type 4	
Color Protective Net <sup>1</sup> Web <sup>2</sup> Wire Net	Moss Green Dark Gray -	Moss Green Dark Gray -	Visual
Thickness, mm	1 - 3	1 - 3	ASTM D1777
Tensile Strength Machine Direction, kN/m	1.5 - 4.0	1.5 - 4.0	ASTM D6818/ ASTM D4595
Mass/Unit Area g/sq.m	70 - 100	70 - 100	ASTM D6566/ ASTM D5261
UV Stability, %, Min.	90	90	ASTM D4355
Water Holding Capacity, %	1,500 - 3000	1,500 - 3000	ASTM D7367
Light Penetration, %	15 - 35	15 - 35	ASTM D 6567
C Factor, Max.	0.02	0.02	ASTM D 6459

*Notes: Type 3 shall include base cloth, plant seed, and fertilizer in accordance with the manufacturer's recommendation*

*Type 4 shall include base cloth, plant seed, fertilizer, and soil amendment in accordance with the manufacturer's recommendation*

*1 – polyethylene resin*

*2 – non-woven fabric made of crimped polyester fiber*

**Table 519.3 Web Composite Mat Requirements for Type 5 and Type 6**

Property	Requirement		Test Method
	Type 5	Type 6	
Color Protective Net <sup>1</sup> Web <sup>2</sup> Wire Net	Moss Green Dark Gray Silvery Metallic Color	Moss Green Dark Gray Silvery Metallic Color	Visual
Thickness, mm	1 - 3	1 - 3	ASTM D1777
Tensile Strength Machine Direction, kN/m	5.0 - 8.0 <sup>3</sup>	5.0 - 8.0 <sup>3</sup>	ASTM D6818/ ASTM D4595
Mass/Unit Area g/sq.m	300 - 350	300 - 350	ASTM D6566/ ASTM D5261
UV Stability, %, Min.	90	90	ASTM D4355
Water Holding Capacity, %	350 - 550	350 - 550	ASTM D7367
Light Penetration, %	10 - 30	10 - 30	ASTM D 6567

Property	Requirement		Test Method
	Type 5	Type 6	
Wire Net Reinforcement	Zinc Coated, Galvanized Iron Wire	Zinc Coated, Galvanized Iron Wire	ASTM A1007
Thickness of Wire, mm	0.5-0.9	0.5-0.9	
C Factor, Max.	0.02	0.02	ASTM D 6459

Notes: Type 5 shall include base cloth, plant seed, and fertilizer in accordance with the manufacturer's recommendation

Type 6 shall include base cloth, plant seed, fertilizer, and soil amendment in accordance with the manufacturer's recommendation

1 – polyethylene resin

2 – non-woven fabric made of crimped polyester fiber

3 – testing shall include wire net

### 519.3 Construction Requirements

#### 519.3.1 Basic Survey of the Slope

The slope survey shall be conducted to ensure that the target slope is 45° to 60°, self-supporting, and stable. Soil hardness shall be measured using a calibrated Yamanaka Soil Hardness Tester in accordance with JGS 1441, Method for Soil Hardness Test, of the Japanese Geotechnical Society (JGS). While the soil pH shall be measured in accordance with JGS 0211, Test Method for pH of Suspended Soil. The result of the basic slope survey shall serve as the basis for selecting the proper type of mat to be utilized.

#### 519.3.2 Selection of Appropriate Type

The proper type of mat shall be selected in accordance with Table 519.4.

**Table 519.4 Selection Criteria**

Type	Purpose and Condition	Soil Hardness <sup>1</sup> , mm	Soil pH
Type 1	A, B	-	-
Type 2	A, B, E <sup>2</sup>	-	-
Type 3	A, C, D	10 – 27	4.5 – 8.0
Type 4	A, C, D, E <sup>2</sup>	28 – 35	
Type 5	A, C, D	10 – 27	
Type 6	A, C, D, E <sup>2</sup>	28 – 35	

Notes: A – greening and prevention of soil erosion

B – soil with natural vegetation

C – soil where weather and environmental conditions are severe, and growth effects such as the prevention of erosion are in strong demand

D – soil with good particle size distribution and good physical and chemical properties

E – slope with gravel soil of 5 cm or less

1 – for slopes with soil hardness of more than 35 mm, other slope protection methods shall be considered

2 – for slopes with gravel soil more than 5 cm, other slope protection methods shall be considered

### **519.3.3 Shipment and Storage**

During periods of shipment and storage, the material shall be protected from direct sunlight, temperatures greater than 60°C, mud, dust, and debris. The mats shall be maintained wrapped in a heavy-duty protective covering.

### **519.3.4 Site Preparation**

The soil surface shall be at final grade, stable, firm, flat, and free from unnecessary plants, rocks, or any other objectionable matter that may affect the adherence of the mat to the surface of the soil.

### **519.3.5 Installation**

Start by fixing the top end of the mat with anchor pins covering 30cm to 50cm of the slope shoulder. Anchoring shall have a 0.5m spacing starting from the slope shoulder according to the anchor patterns or as shown on the Plans. Use anchor pins with at least 9 mm diameter and 200 mm length driven by a hammer with a spacing of 0.5m. Unroll erosion control mats parallel to the drainage flow direction. Spread erosion control mats evenly and smoothly, without stretching, to ensure direct contact with the soil at all points. The installation of mats shall be carefully placed to avoid the mats from being stamped by workers. When driving anchor pins, it is advisable for the worker to control the rolled mats with their feet in order to prevent excessive rolling of the mats.

When connecting the mats along a slope, overlap lateral mats at the width of 3 cm to 5 cm transversely, and take a 5 cm to 10 cm width overlap longitudinally when overlapping the upper mat on the lower one. Check for portions that might require additional anchor pins and damaged areas that need repair.

### **519.3.6 Performance Monitoring**

Post-project monitoring shall be conducted to identify any damage to the installed web composite mats, particularly at junction points, as well as to assess plant growth, any failures in germination, and potential damage caused by sudden rainfall. Repair work will be carried out on affected sections of the slope, and all plants will be replaced in cases of mortality within the warranty period. All repair activities shall be executed in accordance with the manufacturer's recommendations.

### **519.4 Method of Measurement**

Web composite mats shall be measured by the number of square meters of web composite mats installed/placed and accepted.

### **519.5 Basis of Payment**

All work performed and measured and as provided for in the Bill of Quantities shall be paid for at the Contract Unit Price for Web Composite Mats, which price and payments shall be full compensation for furnishing of all materials, labor, equipment, tools, and incidentals necessary to complete the work prescribed in this Item including maintenance.

Payment shall be made under:

<b>Pay Item Number</b>	<b>Description</b>	<b>Unit of Measurement</b>
519 (1)a	Web Composite Mat, Type 1	Square Meter
519 (1)b	Web Composite Mat, Type 2	Square Meter
519 (1)c	Web Composite Mat, Type 3	Square Meter
519 (1)d	Web Composite Mat, Type 4	Square Meter
519 (1)e	Web Composite Mat, Type 5	Square Meter
519 (1)f	Web Composite Mat, Type 6	Square Meter



# **CERTIFICATE OF CONDITIONAL APPROVAL**

This is to certify that

## **Takino Filter Mats**

(MF45R-0, MF45R-0wn, MF45R-10, and MF45R-10wn)

Supplied by

### **Rebtrade International Corporation.**

3rd Floor, Unit 314-316, AIC-Burgundy Empire Tower  
ADB Avenue corners Sapphire Rd., Ortigas Center, Pasig City

is duly accredited for use in DPWH infrastructure as Erosion Control and Vegetation Mat for Slope Protection subject to its specifications pursuant to the provisions of Department Order No. 189, Series of 2002.

This accreditation shall remain in force until expiry date printed below or until such time that the Certificate of Product Accreditation is issued, subject to its compliance with the requirements of the aforementioned Department Order.

Conditional Approval Number	:	<b>0034</b>
Date Issued	:	<b>January 7, 2025</b>
Valid Until	:	<b>January 6, 2030</b>

**ADOR G. CANLAS, CESO IV**

Undersecretary for Technical Services and  
Information Management Service