

Erosion Control: Riprap and Geotextile Charts

Table 3601-1						
Random Riprap Gradation Requirements						
Weight, lb [kg]	Size, in [mm]*	Approximate Percent of Total Weight Smaller than Given Weight				
		Class of Riprap				
		I	II	III	IV	V
2,000 [900]	30 [750]	--	--	--	--	100
1,000 [450]	24 [600]	--	--	--	100	--
650 [300]	21 [525]	--	--	--	--	75
400 [180]	18 [450]	--	--	100	--	--
250 [113]	15 [375]	--	--	--	75	50
120 [55]	12 [300]	--	100	75	50	--
50 [22]	9 [225]	--	75	50	--	--
15 [7]	6 [150]	100	50	--	--	10
5 [2]	4 [100]	--	--	--	10	--
2 [1]	3 [75]	50	--	10	--	--
--	2 [50]	--	10	--	--	--
--	1 [25]	10	--	--	--	--
* Weight to size conversion based on a specific gravity of 2.60 and a volume average between a sphere and cube						

Note: Areas boxed in by a red line indicate the typical requirement used in the District.

Table 3733-1 Geotextile Properties								
Geotextile Property	Test Method (ASTM)	Type (a)						
	Units	1		3	4	5	6	7(c)
		Fabric	Knit sock (b)					
B1 Grab Tensile Strength minimum, each principal direction	D4632 lb. [kN]	100 [0.45]	--	100 [0.45]	200 [0.90]	200 [0.90]	(d)	300 [1.3]
B2 Elongation minimum, each principal direction	D4632 percent	--	--	50	50	--	(d)	50
B3 Seam Breaking Strength minimum (e)	D4632 lb. [kN]	90 [0.40]	--	90 [0.40]	180 [0.80]	180 [0.80]	(d)	270 [1.2]
B4 Apparent Opening Size (AOS) maximum (f)	D4751 U.S. Std. sieve size [mm]	40 [0.425]	40 [0.425] as applied	50 [0.30]	50 [0.30]	30 [0.60]	20 [0.85]	50 [0.30]
B5 Permittivity minimum (g)	D4491 falling head sec ⁻¹	0.7	2.75 relaxed	0.5	0.5	0.05	0.05	0.5
B6 Puncture strength minimum	D6241 Lb [N]	--	180 [800]	--	--	--	--	--
B7 Wide Width Strip Tensile Strength minimum each principal direction	D4595 lb/ft [kN/m]	--	--	--	--	--	(d)	--
(a) Minimum Average Roll Values (MARV) based on average of at least three tests per swatch. (b) Provide socks made of knit polymeric materials and meeting the requirements of ASTM D6707-06, for Type H: fabric. Ensure the sock exhibits minimum snag or run potential, is factory-applied to maintain uniform installed mass, and conforms to the outside diameters of the tubing with a snug fit. (c) Needle-punched nonwoven. Do not use thermally bonded (heat-set) fabric. (d) Requirements are site-specific and will be as specified in the contract. The property values for B1 and B3 may not be less than shown for Type 5. If the contract does not specify either B1 or B7, use default value of 300 lb [1.3 kN] for B1. If the contract does not specify seam strength, use a default value of 270 lb [1.2 kN] for B3. (e) Adhere to this requirement if the contract requires or allows seams. Strength specifications apply to factory and field seams. Use thread for sewing that has strength of at least 25 lb. [110 N]. Sew seams with a Federal Type 401 stitch using a two-spool sewing machine, and install seams facing upward. For seaming with adhesives, see the Approved/Qualified Products List available at the Department's website. (f) For U.S. sieve sizes, the AOS Number must be equal to or greater than the number specified. (g) Permittivity: $P = K/L$, where K = fabric permeability and L = fabric thickness.								

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3733 Geotextiles
3733.1 SCOPE
Provide geotextiles (permeable fabrics) for the typical uses classified as follows:
(1) Type I for wrapping subsurface drain pipe, joints of concrete pipe culvert, or other drainage applications;
(2) Type II. The Department no longer uses this classification. If the contract specifies Type II, use Type III propriety requirements;
(3) Type III for use under Class I and Class II random riprap, gabions, and revet mattresses;
(4) Type IV for use under Class III and Class IV random riprap and hand-placed riprap on slopes no steeper than 3:1, horizontal to vertical;
(5) Type V for separating materials for stabilization;
(6) Type VI for earth reinforcement;
(7) Type VII for use under Class III and Class IV random riprap on slopes steeper than 3:1, horizontal to vertical, and under Class V random riprap.

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