

Application	CLASS 1		CLASS 2		CLASS 3	
	Woven (elongation < 50%)	Nonwoven (elongation > 50%)	Woven (elongation < 50%)	Nonwoven (elongation > 50%)	Woven (elongation < 50%)	Nonwoven (elongation > 50%)
<b>Subsurface Drainage</b>						
% Fines						
< 15%	FW404 NTPEP Listed	180N NTPEP Listed	FW404 NTPEP Listed	160N NTPEP Listed	FW404 NTPEP Listed	140N NTPEP Listed
15% to 50%	N/A		FW700 NTPEP Listed		FW700 <sup>1</sup> NTPEP Listed	
> 50%	N/A					
<sup>1</sup> Default geotextile selection. The engineer may specify a Class 3 geotextile from Table 1 (see note b in specification).						
<b>Separation</b>	600X NTPEP Listed	180N NTPEP Listed	550X 600X NTPEP Listed	160N NTPEP Listed	500X NTPEP Listed	140N NTPEP Listed
<b>Stabilization</b>	600X NTPEP Listed	180N NTPEP Listed	550X 600X <sup>2</sup> NTPEP Listed	160N NTPEP Listed	500X <sup>2</sup> NTPEP Listed	140N NTPEP Listed
<sup>2</sup> Default geotextile selection. The engineer may specify a Class 2 or 3 geotextile from Table 1 (see note 1 and 2 in specification).						
<b>Permanent Erosion Control</b>						
% Fines						
< 15%	FW404 NTPEP Listed	180N NTPEP Listed	FW404 NTPEP Listed	160N NTPEP Listed	FW404 NTPEP Listed	140N NTPEP Listed
15% to 50%	N/A		FW700 NTPEP Listed		FW700 NTPEP Listed	
> 50%	N/A					

	<b>CLASS 1A</b>
	Woven
<b>Enhancement Geotextile</b>	(elongation < 50%)
Based on properties in Table 6	HP570 NTPEP Listed

	Type I	Type II
<b>Paving Fabrics</b>	MPM30	MPV500 NTPEP Listed

**Table 10—Geosynthetic Reinforcement Property Requirements**

	Geosynthetic Type	Test Methods	Units	Requirements	
Minimum Strength to Resist Installation Damage <sup>a</sup>	Geogrid	ASTM D6637/D6637M	kN/m	10 <sup>d</sup>	Miragrid 2XT and 3XT is below weight noted in footnote d, we have supporting data in accordance with R69 to support use of these products.
	Geotextile			Class 1 from Table 1 <sup>d</sup>	
Ultimate Tensile Strength based on Structure Specific Design	Geogrid	ASTM D6637/D6637M	kN/m	Site and Structure Specific Value of $T_{max} \times FS \times RF^b$	
	Geotextile	ASTM D4595	kN/m	Site and Structure Specific Value of $T_{max} \times FS \times RF^b$	
$RF_{TD}$	All	R 69		Value from R 69 for Site Specific Backfill Gradation and Specific Product, but Not Less Than 1.1	
$RF_{CR}$	All	R 69		Value from R 69 for Specific Product	
$RF_D$	All	R 69		1.3 <sup>c</sup>	
Secant Stiffness at 1,000 hrs and 2% Strain <sup>e</sup>	All	R 69	kN/m	Site and Structure Specific Value	

<sup>a</sup> The minimum strengths required here are to limit damage to the geosynthetic during installation to a tolerable and predictable level. All values are minimum values unless otherwise specified.

<sup>b</sup>  $T_{max}$  is determined from internal stability analysis of the wall or reinforced slope under consideration in accordance with the AASHTO LRFD Bridge Design Specifications, Article 11.10.6.4.3b. FS is the safety factor, or for Load and Resistance Factor Design (LRFD), the combination of load factor divided by the resistance factor.  $RF = RF_{TD} \times RF_{CR} \times RF_D$ .

<sup>c</sup> The default value of 1.3 shall be used only if the geosynthetic meets the minimum requirements in Table 10 and the backfill soil chemical properties meet the requirements in Table 11. If the effective design temperature is greater than 20°C but less than 30°C, a default value for  $RF_D$  of 1.5 should be used. If  $RF_D$  is greater than 1.7, consideration should be given to either using a finer backfill material with a smaller top size to reduce installation damage, or conducting long-term chemical durability tests on damaged material to justify the use of a default reduction factor of  $RF_D$ .

<sup>d</sup> Minimum strength requirements are based on the results of numerous exhumations of geosynthetics, in which it was determined that installation damage was minimal for products with a minimum weight of 270 g/m<sup>2</sup> (8 oz/yd<sup>2</sup>) (Koerner and Koerner, 1990; Allen, 1991). This roughly corresponds to a Class 1 geotextile as specified in Table 1. A lighter weight geotextile class may be used if site specific installation damage testing is conducted in accordance with R 69, and  $RF_{TD}$  is determined to be 1.7 or less.

<sup>e</sup> Property requirement is optional as specified by the purchasing agency.

**Geotextile and Geogrid Property Requirements for Reinforced Soil Applications.** Table 10 has been added for MSE structures. Section 11.1 does indicate – “This specification is applicable to placing a geotextile or geogrid between layers of compacted fill for reinforced soil structures such as retaining walls or reinforced slopes.” If a roadway specs or other applications referenced with properties in Table 10, we should explain the proper applications for Table 10 is MSE walls and slopes. If specifications for retaining walls reference Table 10 and indicate a Class 1 geotextile which is Mirafi 600X and Mirafi 180N, these products should not be used as reinforcement for MSE structures. Section 11 should only be used for Miragrid XT geogrid products. It is not for Class 1 or even Class 1A materials. We recommend using NTPEP REGEO data and Miragrid XT geogrids for MSE structures as outlined in Section 11.