



QUICK REFERENCE GUIDE - ROUTINELY PERFORMED GEOSYNTHETIC TESTS

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Item	Test Description	Comments	Current Procedure	Old Procedure
GEOMEMBRANE SEAM TESTING (SAME-DAY SERVICE):				
1	Peel and Shear	for thermal welds	ASTM D 6392	ASTM D 413 ASTM D 3083 ASTM D 4437
2	Peel and Shear	for reinforced geomembrane thermal welds	ASTM D 751 shear ASTM D 413 peel	
3	Peel and Shear	for chemical fusion welds, generally requires overnight curing	ASTM D 6214	ASTM D 413 ASTM D 3083 ASTM D 4437
GEOMEMBRANE TESTING:				
1	Asperity Height	for textured geomembranes	GRI GM12	
2	Carbon Black Content	Pyrolysis in tube furnace with inert atmosphere	ASTM D 1603	
3	Carbon Black Content	Pyrolysis in muffle furnace	ASTM D 4218	
4	Carbon Dispersion	Microscopic observation and comparison dispersion in rubber (D 2663)		ASTM D 3015
5	Carbon Dispersion	Microscopic observation and comparison with polyethylene geomembrane dispersion standards	ASTM D 5596	
6	Coefficient of Linear Thermal Expansion		ASTM D 696	
7	Constant Load (Single Point Notched) Stress Crack Resistance	QA test, 200 hours	ASTM D 5397 Appendix	
8	Dart Drop		ASTM D 1709	
9	Density		ASTM D 1505	
10	Dimensional Stability	PVC: 100C, 15 minutes (NSF 54, '93) HDPE: 100C, one hour (NSF 54, '93)	ASTM D 1204	
11	Ductile/Brittle Transition Time	Full Percent Yield Stress vs Time-to-Failure Curve	ASTM D 5397	
12	ESCR	1500 hr. exposure	ASTM D 1693	
13	Hydrostatic Resistance		ASTM D 751	
14	Low Temp. Brittleness		ASTM D 746	
15	Melt Flow Index		ASTM D 1238	
16	Modulus - 2% Secant		ASTM D 5323	
17	Modulus - Tangential		ASTM D 638 ASTM D 882	
18	Oxidative Induction Time (OIT)		ASTM D 3895	
19	Oxidative Induction Time - High Pressure (HPOIT)	used to "see" hindered amines	ASTM D 5885	
20	Ply Adhesion	for reinforced geomembranes	ASTM D 413	
21	Puncture Resistance - Index	index "pin-point" puncture - flat chamfered puncture point 8 mm in diameter	ASTM D 4833	
22	Puncture Resistance - Index	index "pin-point" puncture - tapered rod with 3 mm radius tip		FTMS 101C, Meth. 2065
23	Puncture Resistance - Large Scale Hydrostatic	includes critical cone height and site specific aggregate puncture tests	ASTM D 5514	
24	Puncture Resistance - Pyramid Puncture	great comparison test	ASTM D 5594	
25	Soil Burial Resistance	30 day incubation in soil	ASTM D 3083	
26	Specific Gravity/Density		ASTM D 792	
27	Tear Resistance	for nonreinforced geomembranes	ASTM D 1004	
8	Tear Resistance - "Tongue Tear"	for reinforced geomembranes	ASTM D 751	
9	Tear Resistance - Large Scale "Tongue Tear"	for reinforced geomembranes	ASTM D 5884	
10	Tensile Properties - Index	for nonreinforced geomembranes	ASTM D 6637	ASTM D 638
11	Tensile Properties - Index	for nonreinforced geomembranes < 1 mm	ASTM D 882	
12	Tensile Properties - Index	for nonreinforced geomembranes < 1 mm	ASTM D 412	
13	Tensile Properties - Index	for reinforced geomembranes	ASTM D 751-Grab	
14	Tensile Properties - Wide Width		ASTM D 4885	
15	Tensile Properties - Multi-Axial	large scale out-of-plane tensile properties	ASTM D 5617	
16	Thickness		ISO 9863	
17	Thickness	for textured geomembranes	ASTM D 5994	ASTM D 751
18	Thickness	for smooth geomembranes	ASTM D 5199	ASTM D 1777 ASTM D 751
19	Thickness	calculated thickness using mass and density	ASTM D 1593	



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GEOMEMBRANE TESTING (CONTINUED):				
20	UV Resistance	1600 hour exposure via GRI GM 13 using Fluorescent UV	GRI GM 12	
21	UV Resistance	Xenon Arc UV	ASTM D 4355	
22	Volatile Loss	activated carbon procedure for PVC geomembranes	ASTM D 1203	
23	Water Absorption		ASTM D 570	
24	Water Vapor Transmission		ASTM E 96	

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GEOTEXTILE TESTING:				
1	Abrasion Resistance		ISO 13427	
2	Abrasion Resistance		ASTM D 4886	
3	Anchorage	Anchorage (Pull Out Resistance)	ISO 13430	
4	Apparent Opening Size	Same specimen used for each sequential sieving process. Must use antistatic spray or other means of eliminating bias caused by static electricity.	ASTM D 4751	
5	Apparent Opening Size (FOS) - Wet Sieving		ISO 12956	
6	Connection Strength/Strain	Connection Strength of Geosynthetic Reinforcement & Segmental Concrete Units	ASTM D 6638	
7	Gradient Ratio	Soil/Geotextile Clogging Potential by Gradient Ratio	ASTM D 5101	
8	Hydraulic Transmissivity - Planar		ASTM D 4716	
9	Hydraulic Transmissivity - Planar		ISO 12958	
10		Preferred for geotextiles - minimizes leakage	ASTM D 6574	
10	Mass/Unit Area		ISO 9864	
11	Mass/Unit Area		ASTM D 5261	ASTM D 3776
11	Hydraulic Transmissivity - Radial		ASTM D 3786	
12	Permittivity/Permeability	constant or falling head	ASTM D 4491	
13	Permeability		ISO 11058	
14	Pull-Out Resistance	Geosynthetic Pullout Resistance in Soil	ASTM D 6706	
15	Puncture Resistance - Index	index "pin-point" puncture - flat chamfered puncture point 8 mm in diameter	ASTM D 4833	
16	Puncture Resistance - 50 mm probe	Static Puncture Strength of Geosynthetics Using 50 mm Probe	ASTM D 6241	
17	Puncture Resistance - CBR		ISO 12236	
18	Seam Strength	stitched and thermal seams	ASTM D 4884	
19	Seam Strength		ISO 13421	
20	Tensile Strength/Elongation - Grab	"Grab" tensile properties	ASTM D 4632	
21	Tensile Strength/Elongation - Strip		ASTM D 5035	
22	Tensile Strength/Elongation - Wide Width		ASTM D 4595	
23	Tensile Strength/Elongation - Wide Width		ISO 10310	
24	Thickness		ASTM D 5199	ASTM D 1777
25	Thickness		ISO 9863	
26	Trapezoidal Tear		ASTM D 4533	
27	UV Resistance	Xenon Arc UV	ASTM D 4355	



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GEONET / GEOCOMPOSITE TESTING:				
1	Carbon Black Content	Pyrolysis in tube furnace with inert atmosphere	ASTM D 1603	
2	Carbon Black Content	Pyrolysis in muffle furnace	ASTM D 4218	
3	Compressive Behavior	for compressive stress strain behavior	ASTM D 6454	ASTM D 1621 GRI GS1 GRI GN1
4	Density		ASTM D 1505	
5	Hydraulic Transmissivity - Planar		ASTM D 4716	
6	Hydraulic Transmissivity - Planar		ISO 12958	
7	Mass/Unit Area		ASTM D 5261	ASTM D 3776
8	Peel Strength	GRI GC7 only standard specific to geocomposites	GRI GC 7	ASTM D 413 ASTM F 904
9	Puncture Resistance - 50 mm probe	Static Puncture Strength of Geosynthetics Using 50 mm Probe	ASTM D 6241	
10	Puncture Resistance - CBR		ISO 12236	
11	Tensile Strength/Elongation - Strip		ASTM D 5035	
12	Tensile Strength/Elongation - Wide Width		ASTM D 4595	
13	Tensile Strength/Elongation - Wide Width		ISO 10310	
14	Thickness		ASTM D 5199	ASTM D 1777
15	Thickness		ISO 9863	

Item	Test Description	Comments	Current Procedure	Old Procedure
GEOGRID TESTING:				
1	Anchorage	Anchorage (Pull Out Resistance)	ISO 13430	
2	Carbon Black Content	Pyrolysis in tube furnace with inert atmosphere	ASTM D 1603	
3	Carbon Black Content	Pyrolysis in muffle furnace	ASTM D 4218	
4	Connection Strength/Strain	Connection Strength of Geosynthetic Reinforcement & Segmental Concrete Units	ASTM D 6638	
5	Density		ASTM D 1505	
6	Junction Strength		GRI GG2	
7	Pull-Out Resistance	Geosynthetic Pullout Resistance in Soil	ASTM D 6706	
8	Stiffness / Flexibility	In-plane stiffness, modified for geogrids	ASTM D 1388	
9	Tensile Strength/Elongation - Single Rib	both "flexible" and "rigid" geogrids	ASTM D 6637	GRI GG1
10	Tensile Strength/Elongation - Wide Width	both "flexible" and "rigid" geogrids	ASTM D 6637	ASTM D 4595
11	Torsional Rigidity	Rotational stiffness	Corp of Engineers	

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GCL TESTING:				
1	Free Swell	Bentonite test	ASTM D 5890	USPNFXVII GRI-GCL1
2	Flux	34.4 kPa (5 psi) confining stress	ASTM D5887	
3	Internal Shear Strength	QC/QA test with specimen hydrated for 24 hours under 12 kPa (1.74 psi) normal compressive load	ASTM D 6243	
4	Mass/Unit Area	reported at 0% moisture content	ASTM D5993	ASTM D 5261
5	Moisture Content	bentonite test	ASTM D4643/D2216	
6	Peel Strength	only GCL specific peel test, results in force per unit width	ASTM D 6496	
7	Peel Strength	results in force, test modified for 180 degree peel		ASTM D 4632, modified
8	Permeability / Hydraulic Conductivity	34.4 kPa (5 psi) confining stress	ASTM D5887	ASTM D 5084 GRI GCL2
9	Tensile Strength/Elongation - Grab	"Grab" tensile properties	ASTM D 4632	
10	Tensile Strength/Elongation - Wide Width		ASTM D 4595	
11	Tensile Strength/Elongation - Wide Width		ISO 10310	



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ROLLED EROSION CONTROL TESTING:				
1	Biodegradability	Bench-Scale Performance	ECTC Draft Test Method # 5	
2	Channel Protection - Permissible Shear Stress	Bench-Scale Performance	ECTC Draft Test Method # 3	
3	Compression Behavior	Index	ASTM D 6454	
4	Density	Index	ASTM D 1505	
5	Light Penetration	Index	ASTM D 6567	
6	Slope Protection Cover (C index) Factor	Bench-Scale Performance	ECTC Draft Test Method # 2	
7	Mass	Index	ASTM D 6475	ASTM D 5261
8	Resiliency	Index	ASTM D 6524	
9	Smoldering Resistance	Index	ECTC Draft Test Method #1	
10	Stiffness	Index	ASTM D 6575	ASTM D 1388
11	Swell	Index	ECTC Procedure	
12	Tensile Properties	Index	ASTM D 5035/ECTC	
13	Thickness	Index	ASTM D 6525	ASTM D 5199
14	Porosity/Open Volume / Unit Area	Index	Calculations	
15	Vegetation Enhancement	Bench-Scale Performance	ECTC Draft Test Method # 4	
16	Water Absorption	Index	ASTM D 1117	

Item	Test Description	Comments	Current Procedure	Old Procedure
SOILS TESTING				
1	Atterberg Limits - One point		ASTM D 4318	
2	Atterberg Limits - Three points		ASTM D 4318	
3	Hydraulic Conductivity - Undisturbed	w/back-pressure saturation	ASTM D 5084	
4	Hydraulic Conductivity - Remoulded	w/back-pressure saturation	ASTM D 5084	
5	Moisture Content		ASTM D 2216	
6	Proctor - Standard		ASTM D 698	
7	Proctor - Modified		ASTM D 1557	
8	No. 200 Sieve Wash		ASTM D 422	
9	Sieve Analysis (No. 200 to 3/4 in.)		ASTM D 422	
10	Sieve Analysis (3/4 in. to 3 in.)		ASTM D 422	
11	Sieve With Hydrometer		ASTM D 422	
12	Unit Weight			