

MATERIAL SPECIFICATION

514. Manufactured Ditch Checks

1. Scope

This specification covers the types of material used in various manufactured ditch check products and associated installation materials.

2. Urethane Foam Geotextiles

This product consists of an inner core of urethane foam with an outer lining of geotextile fabric, with aprons of geotextile fabric extending away from the foam core for two to three feet. The urethane foam core shall be affixed to the soil with U-shaped wire staples (No.11 gauge wire and at least 6-8 inches long).

Center Height	10"
Base Width	20"
Section Length	7'

Geotextile Fabric Properties	Test Method	Value (md/cd)
Grab Tensile Strength	ASTM D-4623	180/105 lbs.
Grab Elongation	ASTM D-4623	20/15%
Trapezoidal Tear	ASTM D-4533	85/75 lbs.
Puncture	ASTM D-4833	70 lbs.
Mullen Burst	ASTM D-3786	325 psi
Permittivity	ASTM D-4491	0.25 sec ⁻¹
A.O.S.	ASTM D-4751	40 US Sieve
UV Resistance (500 hr)	ASTM D-4355	80%+

Urethane Foam Properties	Test Method	Value
Color		Varies
Density	ASTM D-3574-95	1.00±0.1 lbs/ft ³ or greater
Indent. Force Deflection	ASTM D-3574-95	
at 25% deflection	(4" specimen)	30±3 lbs/50 in ²
Tensile Strength	ASTM D-3574-95	10 psi min.
Elongation	ASTM D-3574-95	125% min.
Tear Resistance	ASTM D-3574-95	1.25 lbs/in
Comp. Set at 50% Comp	ASTM D-3574-95	10% max.

3. Rolled Erosion Control Products

Rolled erosion control products consist primarily of totally encased straw or excelsior. Straw wattles shall be manufactured from certified weed seed free agricultural straw. Sediment logs shall be manufactured of aspen, a naturally weed free product.

Wattle Properties			
Nominal Diameter	9.0 in	12.0 in	20.0 in
Minimum Diameter	8.5 in	11.5 in	19.0 in
Length ($\pm 10\%$)	25.0 ft	10.0 ft	10.0 ft
Weight* ($\pm 10\%$)	50.0 lbs	30.0 lbs	60.0 lbs
Density* ($\pm 10\%$)	4.53 lbs/ft ³	3.82 lbs/ft ³	2.75 lbs/ft ³

Excelsior Properties				
Nominal Diameter	6.0 in	9.0 in ¹	12.0 in	20.0 in
Minimum Diameter	5.5 in	8.0 in	11.0 in	18.0 in
Length ($\pm 10\%$)	25.0 ft	25.0 ft	10.0 ft	10.0 ft
Weight* ($\pm 10\%$)	12.0 lbs	25.0 lbs	20.0 lbs	30.0 lbs
Density* ($\pm 10\%$)	2.44 lbs/ft ³	2.26 lbs/ft ³	2.54 lbs/ft ³	1.38 lbs/ft ³

*Weight is based on a dry fiber weight basis at time of manufacture. Baseline moisture content of Great Lakes Aspen excelsior is 22%.

Straw/Excelsior Design Values¹					
Material Diameter	Density* (lbs/ft³)	GPM/ft²	GPM/linear ft of Installed Product	P Factor** (event based)	% Soil Retained
6' Sediment Log	2.4	42.5	19.5	0.461	53.9
9" Wattle	4.5	7.5	5.6	0.676	32.4
9" Sediment Log	2.3	42.5	29.0	0.461	53.9
12" Wattle	3.8	8.0	8.0	0.828	17.2
12" Sediment Log	2.5	40.0	36.7	0.297	70.3
20" Sediment Log	1.4	37.5	46.9	0.297	70.3

¹Values from American Excelsior Company specifications for excelsior and straw products

*Weight is based on a dry fiber weight basis at time of manufacture. Baseline moisture content of Great Lakes Aspen Excelsior and straw fibers are 22% and 15%, respectively.

**Based on ASTM D5141

4. Plastic Permeable Checks

Standard plastic permeable checks are constructed of durable UV stabilized HDPE plastic. Degradable versions include an additive to promote biodegradation over an 18 to 24-month period, dependent upon environmental conditions. Either version will require use of erosion control blankets to help prevent undermining of the check dams and encourage vegetation growth. 10-inch spiral spikes shall be used to anchor the product to the ground.

Erosion control blanket grade is based upon channel geometry and flow conditions. Follow manufacturers recommended installation procedures or IUM XXX, whichever is more stringent. Staples should be a minimum of 6 inches in length and placed at intervals of 1.67 feet.

Plastic Permeable Check Properties					
Material	Color	Porosity	Length (ft.)	Height (ft.)	Weight (lbs/ft)
High Density Polyethylene (HDPE) with UV Inhibitor	Black	35 – 40	3.28	0.738	2.1/3.28
High Density Polyethylene (HDPE) with UV Inhibitor & Biodegradation Additive	Tan	35 – 40	3.28	0.738	2.1/3.28

5. Synthetic Porous Runoff Control Structures

Synthetic porous runoff control structures consist of two panels held together by pins and secured to the soil with pins. Number of panels used for an individual check depends upon the geometry of the channel. This practice also incorporates the use of an erosion control blanket, either as a channel liner or at individual check locations. Erosion control blankets shall be installed per manufacturer's specifications or the IUM XXX, whichever is more stringent.

<u>Porous Panel Properties</u>	
Material	UV Resistant High-Density Polyethylene (HDPE)
Size	10" high x 43" long with a 2" lip
Single Rib Thickness	Top: $\frac{5}{32}$ " Bottom: $\frac{5}{32}$ "
Distance Between Ribs	Top: $\frac{1}{2}$ " Bottom: $\frac{5}{32}$ "
Apparent Opening Size	US Sieve No. 4 (Average Value)
Percent Open Area	30% (Average Value)
Weight	3.7 lbs/yd ²
Tensile Strength	MD = 1,800 lbs/ft TD = 1,500 lb/ft
Velocity Reduction	10% to 74%
Kinetic Energy Reduction	40% to 85%

<u>Pin Properties</u>			
	Long Regular Duty	Standard Heavy Duty	Short Heavy Duty
Size	4" x 27"	4" x 21"	4" x 16"
Product	Deformed D 3.5 Rod	Deformed D 4.5 Rod	Cold Rolled Steel
Diameter	0.211"	0.240"	0.312"
Tensile Strength	8,000 psi	8,000 psi	8,000 psi
Grade	C1008	C1008	C1008
Point Type	Blunt	Sharp	Sharp

Pin Driver Properties

Reinforced Welded Steel Construction

Strip Erosion Matting Properties

Product	High velocity biodegradable jute/straw coconut blanket
Grab Tensile (ASTM D46329)	(Dry) Warp: 900 lbs/ft, Fill: 220 lbs/ft (Wet) Warp: 750 lbs/ft, Fill: 175 lbs/ft
High Velocity Flow	34.03 ft/sec
Velocity Shear	4.76 lbs/ft ² @ flow rate
Mannings N	0.0246

6. Vegetated Ditch Checks

Vegetated ditch checks are modular in form consisting of rolled product filled with a native pellet mixture and is available in three styles.

- 1) Simple hooded multi-check without a check flap or cape.
- 2) Hooded multi-check with a check flap.
- 3) Hooded multi-check with a check flap and cape.

The cape is installed towards downstream flow side. The check flap covers the joint between individual multi-check units.