



ROLLED EROSION CONTROL

SYSTEMS BROCHURE





When It Rains (or Blows, Flows or Washes), It Pours

Erosion not only wears away slopes, degrades shorelines and steals precious topsoil, it can also threaten water sources, damage man-made structures, reconfigure landscapes and disrupt wildlife habitats. Add the stiff penalties at stake for violating Environmental Protection Agency (EPA) or local enforcement agency regulations, and the costs of erosion can quickly climb out of control.

WE ROLL AGAINST THE FLOW

North American Green is the world's leading provider of performance-guaranteed erosion control solutions. For more than 25 years, North American Green® line of erosion and sediment control products has kept our customers on solid ground.

The RollMax™ Systems' family of Rolled Erosion Control Products (RECPs) is solid evidence of Tensar's ongoing investment in innovation. Our short-term and long-term erosion control blankets and turf reinforcement mats keep you one step ahead of just about any erosion challenge.

ALL THE HELP YOU NEED

Of all the RECP manufacturers out there, none can match Tensar's customer service and technical knowhow. Our support team will assist with project design and product specification or, if you'd rather do it yourself, use our Erosion Control Materials Design Software (ECMDS®) (the industry's first) for selecting material, and planning your project.

North American Green products are sold exclusively through nearly 200 Erosion Control authorized distributors worldwide. The North American Green Erosion Solutions Specialist program certifies our distributors and their sales representatives to design erosion control measures that comply with the EPA's National Pollutant Discharge Elimination System (NPDES) and other industry regulations.

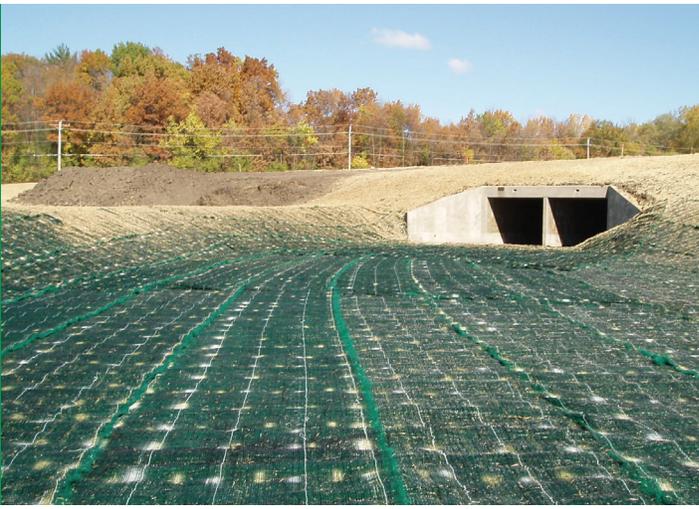
North American Green is a proud member of the Erosion Control Technology Council (ECTC) and the International Erosion Control Association (IECA).



Site erosion can be costly, with the RollMax Systems full line of rolled erosion control products we can keep you in compliance.



For more than 25 years, our North American Green line of products has kept our customers on solid ground.



Applications Welcome

For nearly every erosion application, there's a RollMax™ Systems solution. Permanent turf reinforcement mats provide long-term protection and vegetation establishment; temporary Erosion Control Blankets (ECBs) give immediate protection and assist with vegetation establishment before degrading naturally. North American Green extensive selection of RollMax products almost guarantees you'll find the answer to your erosion problems.

Typical erosion control applications include these and many more:

- ▶ Highway and other DOT projects
- ▶ Commercial and residential developments
- ▶ Shorelines and waterways
- ▶ Golf course turf management
- ▶ Oil and gas pipeline restoration
- ▶ Mine and fire reclamation
- ▶ Military base construction

AND SPEAKING OF GUARANTEES . . .

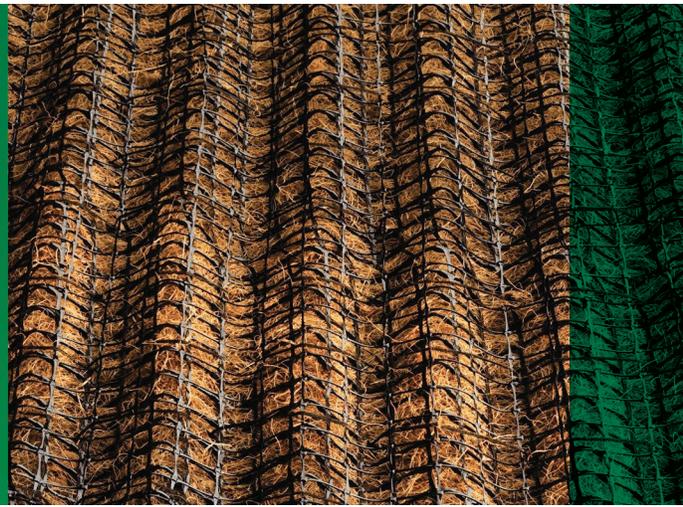
North American Green Ultimate Assurance Guarantee is the most comprehensive in the industry. It says if any properly specified and installed North American Green® rolled erosion control product designed by a qualified engineer or North American Green technical representative in accordance with our Erosion Control Materials Design Software (ECMDS®) fails to perform under the conditions in the Guarantee, then we will replace the failed product with our next higher-performance RECP product, along with the cost of seed, fertilizer, topsoil and other amendments lost due to such product failure. Our Guarantee warrants in accordance with its terms and conditions all registered projects designed with the latest version of our ECMDS and properly installed.

North American Green turf reinforcement mats are also guaranteed to reinforce vegetation for five years after installation, and the functional longevity of these products' permanent structures is warranted for a minimum of 10 years after installation, subject to the terms and conditions set forth in the Guarantee.



From challenging roadway improvements to concentrated flow channels, there is a RollMax product ready to handle the job – and it's guaranteed.

Permanent RollMax™ Solutions



Back in the day, rock riprap, articulated concrete blocks and poured concrete were the only way to deal with erosion in high-flow channels, on shorelines and other areas where water and/or wind exceed the shear limits of unreinforced vegetation.

Not anymore. North American Green permanent Turf Reinforcement Mats (TRMs) use 100% synthetic components or a composite of synthetic and natural materials for long-term erosion protection and vegetation establishment. Whether compared to rock riprap or concrete, the RollMax™ Systems' permanent TRMs offer a number of significant advantages:

- ▶ Prevent loss of precious topsoil to wind and water erosion
- ▶ Permanently reinforce vegetation root and stem structures
- ▶ Provide excellent conditions for quick, healthy vegetation growth
- ▶ Stabilize slopes from erosion to keep roadways safe and clean
- ▶ Protect water quality in lakes, rivers and streams
- ▶ Protect dormant seeding during winter months
- ▶ Easily conform to landscape features
- ▶ Lightweight for easy handling and transportation



The TRMs easily conform to various landscape features to prevent the loss of precious topsoil.

VMAX® COMPOSITE TURF REINFORCEMENT MATS

VMax® C-TRMs combine three-dimensional matting with fiber matrix material for permanent erosion control on severe slopes, spillways, stream banks, shorelines and in high- to extreme-flow channels. These extensively tested products provide maximum performance through all three phases of reinforced vegetative lining development: unvegetated, establishment, and maturity. Incorporating the best performance features of temporary and permanent North American Green erosion control products, VMax C-TRMs deliver these tangible benefits:

- ▶ Surface-applied for the highest level of immediate soil protection
- ▶ Less than one third of the installed cost of rock or concrete
- ▶ No heavy equipment needed to install
- ▶ More attractive and effective “Green” alternative than rock riprap or concrete

VMax® High-Performance TRMs (HPTRMs)

VMax® HPTRMs utilize patent-pending woven 3-D structures that are soil-filled for use in areas experiencing high stress and strain. The VMax HPTRMs are designed to provide appropriate thickness and open area for effective erosion and vegetation reinforcement against high flow induced shear forces. Our HPTRMs are excellent for increased bearing capacity of vegetated soils subjected to heavy loads from maintenance equipment and other vehicular traffic.



The RollMax TRMs are installed in a one-step operation directly over the prepared seedbed saving time and money and ensuring the highest level of erosion control and vegetation reinforcement.



VMax® TMax™ Permanent HPTRM

The TMax HPTRM woven polypropylene technology is designed to provide appropriate thickness and open area for effective erosion and vegetation reinforcement against high flow induced shear forces up to 15 pfs (kN/m²), and with the highest tensile strength on the market up to 5,000 lbs/ft (73 kN/m). TMax may be used as an alternative to hard armor system in extreme erosion control applications.

VMax® P550® Permanent TRM

P550® TRM has a polypropylene fiber matrix augmenting the permanent netting structure with permanent mulching and erosion control performance. Unvegetated, the P550 TRM reduces soil loss to less than 0.5 in. (12.7 mm) under shear stress up to 4.0 lbs/ft² (191 Pa). The ultra-strong structure drives the vegetated shear resistance up to 14 lbs/ft² (672 Pa). The P550 TRM may be used as an alternative for poured concrete or articulated concrete blocks in extreme erosion control projects.

VMax® C350® Permanent TRM

A 100% coconut fiber matrix supplements the C350's permanent three-dimensional netting structure with initial mulching and erosion control performance for up to 36 months. Unvegetated, the C350® TRM reduces soil loss to less than 0.5 in. (12.7 mm) under shear stress up to 3.2 lbs/ft² (153 Pa) and boosts permanent vegetation performance up to 12 lbs/ft² (576 Pa). This environmentally friendly alternative to 30 in. (76 cm) or larger rock riprap is ideal for severe erosion control projects.



To boost performance of the VMax turf reinforcement mats in critical applications, combine with our ShoreMax® flexible transition mat to create a system that can dramatically elevate the permissible shear stress and velocity protection beyond many hard armor solutions.

VMax® SC250® Permanent TRM

The SC250® permanent TRM has a 70% straw/30% coconut fiber matrix to enhance initial mulching and erosion control performance for up to 24 months. Unvegetated, SC250 TRMs reduce soil loss to less than 0.5 in. (12.7 mm) under shear stress up to 3.0 lbs/ft²; and increases permanent vegetation performance up to 10 lbs/ft² (480 Pa) for a green alternative to rock riprap.

ERONET™ PERMANENT EROSION CONTROL BLANKETS

The EroNet™ Permanent ECB provides immediate erosion protection and vegetation establishment assistance until vegetation roots and stems mature.

EroNet™ P300® Permanent Erosion Control Blankets

The P300® permanent erosion control blanket consists of UV-stabilized polypropylene fiber stitched between heavy-weight UV-stabilized polypropylene top and bottom nets. These mats reduce soil loss and protect vegetation from being washed away or uprooted, even under high stress. Unvegetated, they reduce soil loss to less than 0.5 in. (12.7 mm) under shear stress up to 3.0 lbs/ft² (144 Pa), and protect vegetation from being washed away or uprooted when exposed to shear stresses up to 8 lbs/ft² (383 Pa).



VMax Mats are perfect for pipe outlets, channel bottoms, shoreline transition zones, and other areas subjected to highly turbulent water flows.

Temporary RollMax™ Solutions



Erosion control has never been so simple yet effective. North American Green RollMax™ temporary Erosion Control Blankets (ECBs) provide immediate erosion protection and vegetation establishment assistance, then degrade once the vegetation's root and stem systems are mature enough to stabilize the soil.

Our high-quality temporary solutions are available in varying functional longevities and materials:

- ▶ Short-term photodegradable blankets with a functional longevity of 45 days up to 12 months
- ▶ Extended-term and long-term photodegradable blankets for protection up to 36 months
- ▶ Short-term biodegradable blankets for protection up to 12 months
- ▶ Extended-term and long-term biodegradable products for protection and mulching from 18 to 24 months

ERONET™ EROSION CONTROL BLANKETS

North American Green EroNet™ ECBs incorporate photodegradable nettings, which means they are broken down by the ultraviolet rays in sunlight. These temporary products can be used in a variety of scenarios, including moderate to steep slopes, medium-to high-flow channels, shorelines and other areas needing protection until permanent vegetation establishment.

EroNet™ C125® Long-Term Photodegradable Double-Net Coconut Blanket

The C125® ECB is made of 100% coconut fiber stitched between heavyweight UV-stabilized polypropylene nets. It offers excellent durability, erosion control and longevity for severe slopes, steep embankments, high-flow channels and other areas where vegetation may take up to 36 months to grow in.



The EroNet temporary ECBs are designed to provide immediate erosion protection and vegetation establishment assistance, and then degrade after the vegetation is mature enough to permanently stabilize the underlying soil. Both short-term and extended-term ECBs are available.



EroNet™ SC150® Extended-Term Photodegradable Double-Net Straw/Coconut Blanket

With a layer of 70% straw and 30% coconut fiber stitched between a heavyweight UV-stabilized polypropylene top net and a lightweight photodegradable polypropylene bottom net, the SC150® ECB has increased durability, erosion control capabilities and longevity. It is suitable for steeper slopes, medium-flow channels and other areas where it may take vegetation up to 24 months to grow in.

EroNet™ S150® Short-Term Photodegradable Double-Net Straw Blanket

The S150 ECB is made with a 100% straw fiber matrix stitched between lightweight photodegradable polypropylene top and bottom nets. The S150 ECB's double-net construction has greater structural integrity than single net blankets for use on steeper slopes and in channels with moderate water flow. It provides erosion protection and mulching for up to 12 months.

EroNet™ DS150™ Ultra Short-Term Photodegradable Double-Net Straw Blanket

The DS150™ ECB is suitable for high maintenance areas where close mowing will occur soon after installation. Special additives in the thread and top and bottom net ensure it degrades in adequate sunlight within 60 days.

EroNet™ S75® Short-Term Photodegradable Single-Net Straw Blanket

The S75® ECB protects and mulches moderate slopes and low-flow channels in low maintenance areas for up to 12 months. It is constructed of 100% straw fiber stitched with degradable thread to a lightweight photodegradable polypropylene top net.

EroNet™ DS75™ Ultra Short-Term Photodegradable Single-Net Straw Blanket

Designed for high maintenance areas where close mowing will occur soon after installation, the DS75™ ECB degrades within 45 days because of special additives in the thread and top net that facilitate rapid breakdown in adequate sunlight.



Every site has its own unique characteristics and challenges. EroNet Erosion Control Blankets are available in varying longevities to suit a variety of scenarios and conditions.



With our Erosion Control Materials Design Software (ECMDS), you can select either short-term, extended-term or long-term EroNet blankets based on your specific design needs.

Temporary RollMax™ Solutions



BIONET® EROSION CONTROL BLANKETS

BioNet® 100% biodegradable ECBs provide effective and all-natural erosion control and vegetation establishment in an environmentally and wildlife friendly manner. All products in the line are made of organic, biodegradable materials perfect for bioengineering applications, environmentally sensitive sites, shaded areas, stream banks and shorelines. Other advantages are:

- ▶ Little to no risk of wildlife entrapment
- ▶ Easy to sprig or plant through
- ▶ High durability, fiber retention and mechanical stability with Leno weave technology
- ▶ Increased water absorption with jute netting vs. polypropylene netting
- ▶ Improved blanket conformance and adherence to soil vs. polypropylene netting
- ▶ Enhanced erosion protection and mulching capabilities vs. polypropylene netting
- ▶ Durable, flexible and 100% biodegradable
- ▶ Lightweight jute netting requires no direct sunlight exposure to initiate degradation



BioNet® C125BN™ Long-Term Biodegradable Double-Net Coconut Blanket

A dense layer of coconut fiber stitched between jute nettings allows the C125BN™ ECB to provide more effective erosion protection and mulch than open weave coir nettings. This product performs in critical applications for up to 24 months.

BioNet® SC150BN™ Extended-Term Biodegradable Double-Net Straw/Coconut Blanket

The SC150BN™ ECB features a layer of 70% straw and 30% coconut fiber stitched between biodegradable jute top and bottom nettings. It provides erosion protection and mulching for up to 18 months in applications requiring extra strength and erosion control properties.

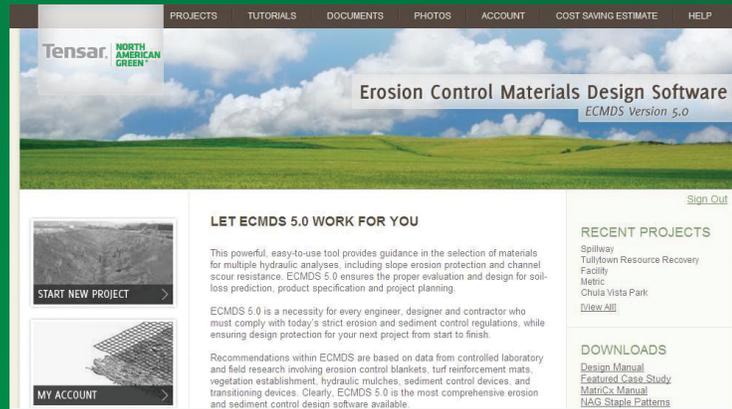
BioNet® S150BN™ Short-Term Biodegradable Double-Net Straw Blanket

The S150BN™ ECB is used for applications requiring greater durability and performance than a single-net biodegradable ECB can provide. Made with a 100% straw fiber matrix stitched between biodegradable jute top and bottom nettings, it offers up to 12 months of erosion protection and mulching action.

BioNet® S75BN™ Short-Term Biodegradable Single-Net Straw Blanket

Consisting of a 100% straw fiber matrix stitched to a biodegradable jute top nettings, the S75BN™ ECB provides better erosion protection and mulching action than conventional open weave jute nettings alone. The S75BN ECB provides up to 12 months of erosion control and vegetation growth support.

Design and Installation Tools



SHIFT, CONTROL, ENTER

Professional guidance on RECP selection, design and project planning is at your fingertips with Tensar's proprietary Erosion Control Materials Design Software (ECMDS®). This web-based program incorporates design methodologies from the Federal Highway Administration and United States Department of Agriculture to analyze your specific site conditions, and make quantified recommendations based on data from controlled laboratory and field research. ECMDS is a must-have if you face tough erosion and sediment control regulations. Best of all, it's free of charge, compliments of North American Green. To learn more and access the software directly, go to www.ECMDS.com.

INSTRUCTIONS INCLUDED

Proper anchoring patterns and rates must be used to achieve optimal results in RECP installation. View our installation guides for stapling patterns. Site specific staple pattern recommendations based on soil type and severity of application may be acquired through our ECMDS.



HOLD ON TIGHT

When under the pressure of severe conditions, even the best erosion control products can't function to their full potential without proper installation and anchoring. North American Green supplies a wide variety of fastener options for nearly every application and soil type.

For use in cohesive soils, wire staples are a cost-effective means to fasten RECPs. Available in 6 in., 8 in., 10 in. and 12 in. lengths, our U-shaped staples can reach to various depths to ensure adequate pull-out resistance. For installation using our handy Pin Pounder installation tool, 6 in. V-top staples or 6 in. circle top pins are available.

Our biodegradable BioStakes® are available in 4 in. and 6 in. lengths and provide an environmentally friendly alternative to metal staples. For an even more durable, deeper reaching yet all-natural anchoring option, our wood EcoStakes® are available in 6 in., 12 in., 18 in. and 24 in. lengths.

For severe applications needing the ultimate, long-lasting hold, try our 12 and 18 in. rebar staples, our 12 in. plastic ShoreMax® stakes, or our complete line of percussion earth anchors. The Tensar earth anchors reach deep into the soil strata to offer enhanced anchoring in the worst conditions. Our variety of earth anchors are designed for durability and holding power under extreme hydraulic stresses and adverse soil conditions (Table 1).

For more information on the RollMax Systems or other systems within the North American Green Erosion Control Solutions, call **800-772-2040** or visit nagreen.com.

Earth Anchor Options

				EA 400		EA 680			
		Tendon Type (1/2 in. x 36 in.)	Assembly Description	Fast Install	Economic Anchor	Stainless	Galvanized	Stainless	Galvanized
End Piece Options with a PVC Face Plate	Copper Stop Sleeve with Stainless Steel Washer	Manually crimped to the stainless steel cable to secure the face plate.			X	X		X	
	Grip End Piece with Stainless Steel Washer	Three-dimensional, self-securing metal end piece that does not require manual crimping for tendon tensioning.	X	X	X	X	X	X	
	Wedge Grip Piece	Self-securing end piece that installs flush to the face plate. Does not require manual crimping for tendon tensioning.	X		X	X	X	X	
	Aluminum Stop Sleeve with Stainless Steel Washer	Manually crimped to the galvanized cable to secure the face plate.					X	X	

TABLE 1

The complete line of RollMax™ products offers a variety of options for both short-term and permanent erosion control needs. Reference the RollMax Products Chart below to find the right solution for your next project.



RollMax Product Selection Chart

TEMPORARY					
Product Description	Longevity	Applications	Design Permissible Shear Stress lbs/ft ² (Pa)	Design Permissible Velocity ft/s (m/s)	
ERONET					
 DS75 1.5 lb., accelerated photodegradable, polypropylene top net, 100% straw fiber matrix	45 days	Low Flow Channels 4:1 - 3:1 Slopes	Unvegetated 1.55 (74)	Unvegetated 5.0 (1.52)	
 DS150 1.5 lb., photodegradable, polypropylene top & bottom net, 100% straw fiber matrix	60 days	Moderate Flow Channels 3:1 - 2:1 Slopes	Unvegetated 1.75 (84)	Unvegetated 6.0 (1.83)	
 S75 1.5 lb., photodegradable, polypropylene top net, 100% straw fiber matrix	12 months	Low Flow Channels 4:1 - 3:1 Slopes	Unvegetated 1.55 (74)	Unvegetated 5.0 (1.52)	
 S150 1.5 lb., photodegradable, polypropylene top & bottom net, 100% straw fiber matrix	12 months	Moderate Flow Channels 3:1 - 2:1 Slopes	Unvegetated 1.75 (84)	Unvegetated 6.0 (1.83)	
 SC150 2.9 lb., UV-stable polypropylene top net, 70% straw/30% coconut fiber matrix, 1.5 lb., photodegradable polypropylene bottom net	24 months	Medium Flow Channels 2:1 - 1:1 Slopes	Unvegetated 2.0 (96)	Unvegetated 8.0 (2.44)	
 C125 2.9 lb., UV stable polypropylene top & bottom nets, 100% coconut fiber matrix	36 months	High Flow Channels 1:1 and Greater Slopes	Unvegetated 2.25 (108)	Unvegetated 10.0 (3.05)	
BIONET					
 S75BN 9.3 lb., leno woven biodegradable jute top net, 100% straw fiber matrix	12 months	Low Flow Channels 4:1 - 3:1 Slopes	Unvegetated 1.60 (76)	Unvegetated 5.0 (1.52)	
 S150BN 9.3 lb., leno woven biodegradable jute top net, 100% straw fiber matrix, 7.7 lb., woven biodegradable jute bottom net	12 months	Moderate Flow Channels 3:1 - 2:1 Slopes	Unvegetated 1.85 (88)	Unvegetated 6.0 (1.83)	
 SC150BN 9.3 lb., leno woven biodegradable jute top net, 70% straw/30% coconut fiber matrix, 7.7 lb., woven biodegradable jute bottom net	18 months	Medium Flow Channels 2:1 - 1:1 Slopes	Unvegetated 2.10 (100)	Unvegetated 8.0 (2.44)	



TEMPORARY					
Product Description	Longevity	Applications	Design Permissible Shear Stress lbs/ft ² (Pa)	Design Permissible Velocity ft/s (m/s)	
BIONET CONT'D					
 C125BN	9.3 lb., leno woven biodegradable jute top net, 100% coconut fiber matrix, 7.7 lb., woven biodegradable jute bottom net	24 mo.	High Flow Channels 1:1 and Greater Slopes	Unvegetated 2.35 (112)	Unvegetated 10.0 (3.05)
 C700BN	143 lb., (700 g) woven biodegradable coir top net, 100% coconut fiber matrix, 7.7 lb., woven biodegradable jute bottom net	36 mo.	High Flow Channels 1:1 and Greater Slopes	Unvegetated 2.35 (112)	Unvegetated 10.0 (3.05)
PERMANENT					
ERONET					
 P300	5.0 lb., UV-stable polypropylene top net, 100% polypropylene fiber matrix, 3.0 lb., UV-stable polypropylene bottom net	Permanent	High Flow Channels 1:1 Slopes	Unvegetated 3.0 (144) Vegetated 8.0 (383)	Unvegetated 9.0 (2.7) Vegetated 16.0 (4.9)
VMAX					
 SC250	5.0 lb., UV-stable polypropylene top & bottom nets, 24.0 lb., UV-stable polypropylene corrugated center net, 70% straw/30% coconut fiber matrix	Permanent	High Flow Channels 1:1 and Greater Slopes	Unvegetated 3.0 (144) Vegetated 10.0 (480)	Unvegetated 9.5 (2.9) Vegetated 15.0 (4.6)
 C350	8.0 lb., UV-stable polypropylene top & bottom nets, 24.0 lb., UV-stable polypropylene corrugated center net, 100% coconut fiber matrix	Permanent	High Flow Channels 1:1 and Greater Slopes	Unvegetated 3.2 (153) Vegetated 12.0 (576)	Unvegetated 10.5 (3.2) Vegetated 20.0 (6.0)
 P550	24.0 lb., UV-stable polypropylene top & bottom nets, 24.0 lb., UV-stable polypropylene corrugated center net, 100% polypropylene fiber matrix	Permanent	Extreme High Flow Channels 1:1 and Greater Slopes	Unvegetated 4.0 (191) Vegetated 14.0 (672)	Unvegetated 12.5 (3.8) Vegetated 25.0 (7.6)
 TMax	100% UV-stable polypropylene monofilament yarns, woven into a 3-D structure	Permanent	Extreme High Flow Channels 1:1 and Greater Slopes	Vegetated 15.0 (718)	Vegetated 25.0 (7.6)
 W3000	100% UV-stable polypropylene monofilament yarns, woven into a 3-D structure	Permanent	Extreme High Flow Channels 1:1 and Greater Slopes	Vegetated 16.0 (766)	Vegetated 25.0 (7.6)



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