



# HYDRAULIC EROSION CONTROL

SYSTEMS BROCHURE



**Tensar**®



## Erosion Can Be a Slippery Slope

Erosion has plagued man since the beginning of time – wearing away slopes, changing the topography and threatening wildlife. Today, erosion associated with construction projects can also damage water sources, necessitate costly rebuilding of degraded slopes and risk violation of local and federal regulations.

### WITH TENSAR, EVERYTHING'S UNDER CONTROL

Tensar International Corporation (Tensar) is the world's leading provider of performance-guaranteed erosion control solutions. Today, we keep thousands of satisfied customers on solid ground with our complete line of Tensar® North American Green® erosion and sediment control products. Tensar's Hydraulic Erosion Control Products, also known as HECPs, are ideal for controlling erosion and establishing vegetation on moderate to extreme slopes.

### THE WHAT AND WHY OF HECPS

Hydraulic erosion control products are mulches applied as a slurry and engineered to reduce soil erosion while assisting in the establishment and growth of vegetation. Tensar® HydraMax™ Systems HECPs contain proprietary blends of fibers, additives and tackifiers to protect slopes. Because they are applied with seed and fertilizer in one step, Tensar HECPs reduce installation time compared to products requiring a two-step application. You'll also like our HECPs for erosion control on slopes because they:

- ▶ Consist of a porous matrix with strong soil adhesion that forms an excellent vegetation establishment and erosion control medium
- ▶ Can reduce soil preparation when compared to Erosion Control Blankets, saving time and money
- ▶ Can be installed as much as three times faster than erosion control blankets with 1/3 of the manpower

- ▶ Come in easy-to-open bales for fast mixing and quick application
- ▶ Have low water-to-mulch ratios that increase productivity by requiring fewer tank loads per site
- ▶ Grow grass quickly with increased germination and biomass production, for quick bond release
- ▶ Are non-toxic per EPA 2021.0 guidelines
- ▶ Contain only biodegradable, non-synthetic fibers
- ▶ Come in a pleasing natural green color for instant site appeal
- ▶ Help you comply with Environmental Protection Agency (EPA) effluent guidelines without treating water with flocculants or advanced water treatment systems
- ▶ Help you earn points toward Leadership in Energy and Environmental Design (LEED®) Green Building Rating System™ project certification goals

If you need guidance in selecting one of our HydraMax Systems HECPs, our web-based Erosion Control Materials Design Software (ECMDS®) provides site analysis and recommendations to ensure proper design and project planning. For more information visit [www.ecmds.com](http://www.ecmds.com).

### HYDRAMAX™ SYSTEMS: HYDRAULIC EROSION CONTROL

All HydraMax System products are made with our patented blend of straw, natural binding reclaimed cotton plant material, additives, and tackifiers to ease application, enhance adhesion, retain moisture and stabilize soil. They have a beneficial carbon-to-nitrogen ratio important for soil quality and vegetation growth.



## HIGH-PERFORMANCE PRODUCTS

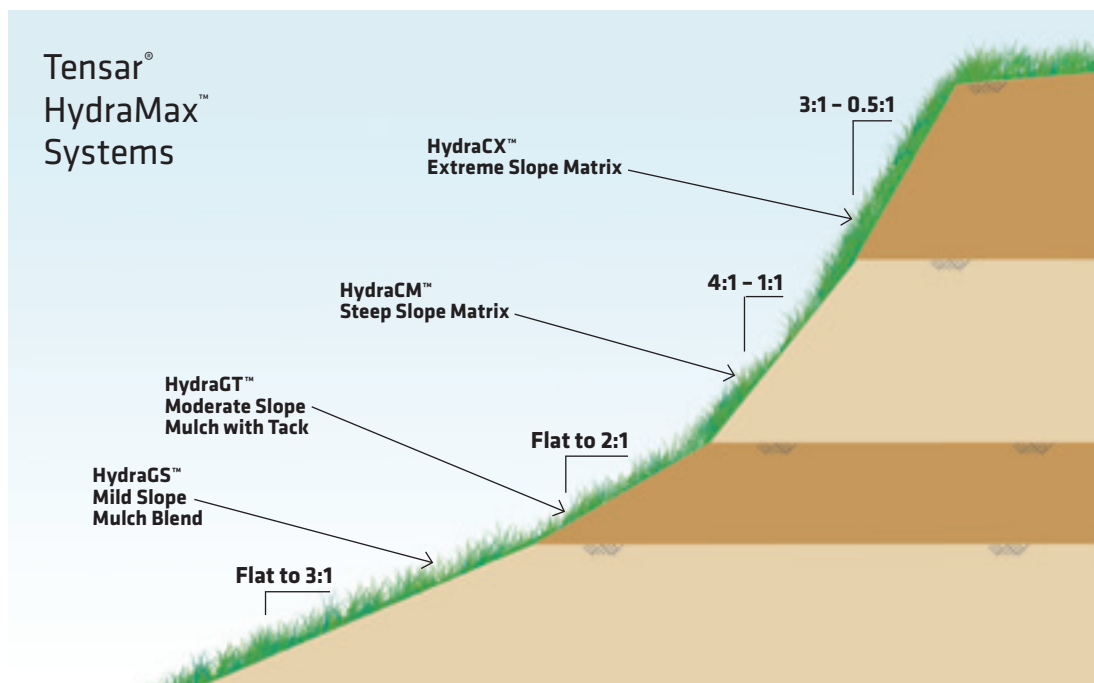
HydraMax™ high-performance HECPs provide exceptional protection on construction site slopes with up to 0.5:1 (H:V) gradients in a simple one-step application. With their cross-linked insoluble hydro-colloidal tackifiers, they have proven unsurpassed erosion control effectiveness in large-scale AASHTO-NTPEP (American Association of State Highway and Transportation Officials – National Transportation Product Evaluation Program) slope testing.

- ▶ HydraCX™ Extreme Slope Matrix is made for long-length, steep to severe slope gradients of 3:1 to 0.5:1. This cost-effective alternative to short-term double net erosion control blankets, provides immediate protection, soil bonding and rapid vegetation for increased effectiveness on extreme terrain.
- ▶ HydraCM™ Steep Slope Matrix is designed for medium-length, moderate to steep slope gradients of 4:1 to 1:1. The HydraCM HECP is a great alternative to single-net erosion control blankets for controlling erosion and establishing vegetation on steep, challenging slopes.

## STANDARD-PERFORMANCE PRODUCTS

HydraMax Systems' standard-performance HECPs offer one-step application and are designed for vegetation establishment on mild to moderate slopes. They are excellent alternatives to blown straw and wood/cellulose-based hydro-mulches, which may take two or three steps to apply with seed and fertilizer.

- ▶ HydraGT™ Moderate Slope Mulch Blend with Tack is a blend of straw and reclaimed cotton plant material fortified with extra tackifiers as compared to the HydraGS. It is ideal for moderate applications and short-reach slopes with up to 2:1 gradients. HydraGT can replace alternative methods such as crimped/tacked/blown straw and wood mulch with tackifier.
- ▶ HydraGS™ Mild Slope Mulch Blend is well-suited for short-reach slopes with up to 3:1 gradients. HydraGS is an economical alternative to wood/cellulose blend mulches for quick and healthy turf establishment and general seeding applications.





## The Difference is in the Details

Tensar knows one size does not fit all, so our lineup of four HECPs suits a wide variety of site characteristics and requirements. Our certified Tensar Erosion Solutions Specialists can assist you in choosing the right product for your site to help you comply with the U.S. Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) and other industry regulations.

When it comes to specifying HECPs, writing specifications based on proven product performance is the only way to truly feel confident that your project will get the protection it needs. Choose only HECPs that form the building block of green engineering by incorporating high-performance soil protection and vegetation establishment while remaining environmentally friendly. You will find that Tensar's HydraMax™ systems have it all.

ECTC Category	Product Name	Functional Longevity <sup>1</sup> (months)	Typical Application Rates lbs/acre (kg/ha)	Typical Slope Gradient Range (H:1V)	Maximum Uninterrupted Slope Length (feet)	C-Factor <sup>2,3</sup>	Minimum Vegetation Establishment <sup>4</sup>	Composition	Potential Replacement for:
5	HydraCX™ Extreme Slope Matrix	12	3,000 – 4,500 (3,400 – 5,100)	3:1 – 0.5:1	100	0.001	550%	65% ± 3% mechanically processed straw; 25% ± 3% mechanically processed cotton plant material; 10% ± 1% proprietary blend of tackifiers, activators and additives	Short-Term Double-Net Erosion Control Blankets and Fiber Reinforced Matrix
4	HydraCM™ Steep Slope Matrix	6	2,500 – 4,000 (2,800 – 4,500)	4:1 – 1:1	75	0.003	450%	70% ± 3% mechanically processed straw; 20% ± 3% mechanically processed cotton plant material; 10% ± 1% proprietary blend of tackifiers, activators and additives	Short-Term Single-Net Erosion Control Blankets and Bonded Fiber Matrix
3	HydraGT™ Moderate Slope Mulch Blend with Tack	4	1,500 – 2,500 (1,700 – 2,800)	Flat – 2:1	50	0.049	362%	80% ± 3% mechanically processed straw; 17% ± 3% mechanically processed cotton plant material; 3% ± 1% proprietary blend of tackifiers, activators and additives	Crimped/Tacked/Blown Straw, Wood Mulch with Tack
2	HydraGS™ Mild Slope Mulch Blend	3	1,500 – 2,000 (1,700 – 2,250)	Flat – 3:1	25	0.090	333%	84% ± 3% mechanically processed straw; 17% ± 3% mechanically processed cotton plant material; <1% proprietary blend of tackifiers, activators and additives	Wood/Cellulose Blend Mulches

*This table is for general guidelines only. Visit our website for application rates, instructions, gradients, maximum continuous slope lengths and other site-specific recommendations.*

<sup>1</sup>Manufacturer's estimated time period, based upon field observations, that the material can be anticipated to provide erosion control as influenced by its composition and site-specific conditions.

<sup>2</sup>Cover factor (C-factor) calculated as a ratio of soil loss from HECF-protected slope (tested at 3H:1V) to soil loss from unprotected (control) plot based on testing through the American Association of State Highway and Transportation Officials' National Transportation Product Evaluation Program (AASHTO-NTPEP).

<sup>3</sup>Large-scale test methods shall be ASTM D 6459 as modified by AASHTO-NTPEP.

<sup>4</sup>Minimum vegetation establishment is calculated as outlined in ASTM D 7322.



## We Have Application Down to a Science

Tensor's engineers have taken all the guesswork out of applying HECPs for maximum efficiency and effectiveness. Please refer to our detailed instruction guide for substrate and seedbed preparation, installation, mixing, application, equipment cleaning and protection recommendations.

### Typical Application Rates

HydraCX™ Extreme Slope Matrix		
Slope Conditions	Rate (English)	Rate (metric)
≥1H:1V	4,500 lbs/acre	5,100 kg/ha
≥2H:1V and <1H:1V	4,000 lbs/acre	4,500 kg/ha
≥3H:1V and <2H:1V	3,500 lbs/acre	3,900 kg/ha
<3H:1V	3,000 lbs/acre	3,400 kg/ha

HydraCM™ Steep Slope Matrix		
Slope Conditions	Rate (English)	Rate (metric)
≥2H:1V	4,000 lbs/acre	4,500 kg/ha
≥3H:1V and <2H:1V	3,500 lbs/acre	3,900 kg/ha
≥4H:1V and <3H:1V	3,000 lbs/acre	3,400 kg/ha
<4H:1V	2,500 lbs/acre	2,800 kg/ha

HydraGT™ Moderate Slope Mulch Blend with Tack		
Slope Conditions	Rate (English)	Rate (metric)
>3:1 and <2.5:1	2,500 lbs/acre	2,800 kg/ha
>4:1 ≤3:1	2,000 lbs/acre	2,250 kg/ha
≤4:1	1,500 lbs/acre	1,700 kg/ha

HydraGS™ Mild Slope Mulch Blend		
Slope Conditions	Rate (English)	Rate (metric)
>4:1 ≤3:1	2,000 lbs/acre	2,250 kg/ha
≤4:1	1,500 lbs/acre	1,700 kg/ha

### THE PROOF IS IN THE PUTTING

When it comes to real-world applications, the proof of our products' performance is in the putting – putting our experience and proven test data behind our designs. Our HydraMax™ line of HECPs has been successfully used in a wide range of applications.

- ▶ Fire and Mine Reclamation
- ▶ Landfills
- ▶ Golf Courses and Sports Fields
- ▶ Oil and Natural Gas Restoration
- ▶ Military Installations
- ▶ Army Corp of Engineers Projects
- ▶ Commercial and Residential Developments
- ▶ DOT/Highways and Airports
- ▶ Retaining and Mechanically Stabilized Earth Walls

### WHAT DOES TWO TANK LOADS MEAN TO YOU?

With a recommended 100 gals/50 lbs water-to-mulch ratio, HydraMax mulches give you 25% more mulch per tank load than mulches with a water:mulch ratio of 125 gals/50 lbs. HydraMax mulches allow more mulch per tank load – resulting in less water usage, less fuel consumption, more coverage per tank, fewer tank loads, increased productivity, and a job done faster!

**Same project size, same equipment –  
Fewer tank loads with HydraMax™ for a job done faster\***



HydraMax



125 gal/bag mulch

*\*Based on a 4-acre site with 3,000 lb/acre application rate using a 3,000-gallon hydroseeding tank.*

## HydraMax™ Protection to the Extreme

To push the HydraMax™ HydraCX™ to its performance extremes, an extended rain event test was conducted at San Diego State University under the following conditions:

Test Standard	Extended Rain Event	Performance
ASTM D 6459* On 3:1 (H:V) slope	2,4,6 in./hrs for 20 minutes followed by <b>6 in./hr for 60 minutes</b>	C-factor: 0.003 99.7% Effective

\*Modified test bed size and rainfall height

The extended rain event totaled **10 in. of rainfall over a 2-hour time period**. You can be assured that with HydraCX your project will be protected even through the most extreme torrential rainfall conditions.

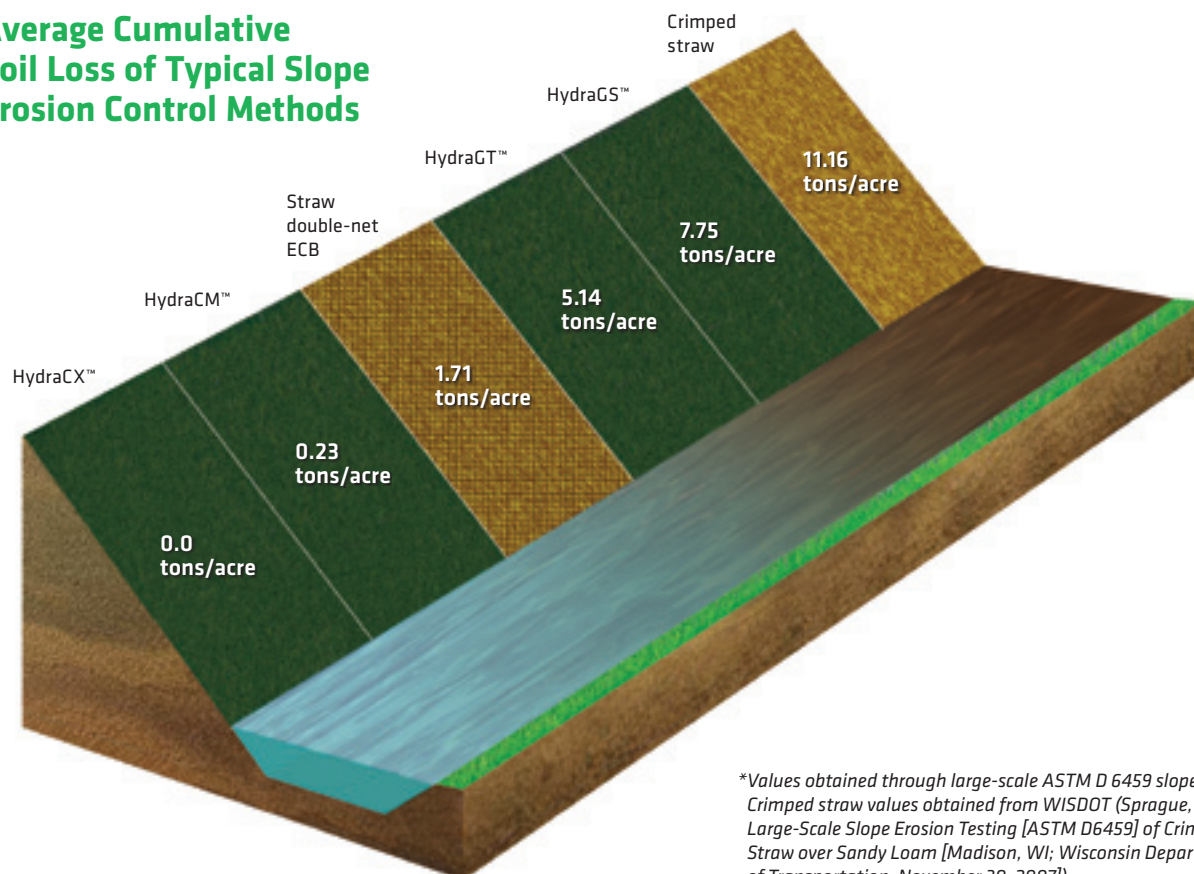
## Tensar® HydraMax™ Systems Make the Grade

To guarantee our HECs perform under actual field conditions, we subject them to modified ASTM D 6459 large-scale slope testing protocol. In general, the large-scale slope tests report average soil loss from product test plots and compare the results to the average soil loss from bare soil control plots. From these soil loss values, a Cover-factor (or C-factor) is determined. The C-factor, a direct representation of the products' erosion control effectiveness, is employed in the U.S. Department of Agriculture's (USDA) Revised Universal Soil Loss Equation (RUSLE) for predicting sheet and rill erosion on slopes.

### INDEPENDENT THIRD-PARTY TEST RESULTS SPEAK VOLUMES, OR SHOULD WE SAY, LACK THEREOF!

In independent third-party testing by AASHTO-NTPEP using modified ASTM D 6459 protocol, HydraCX™ Extreme Slope Matrix demonstrated an unprecedented 100% soil protection and our HydraCM™ Steep Slope Matrix registered an outstanding 99.7% effectiveness in reducing soil erosion! Rest assured that when you design with HydraMax you will achieve NPDES compliance with total peace of mind.

### Average Cumulative Soil Loss of Typical Slope Erosion Control Methods



\*Values obtained through large-scale ASTM D 6459 slope testing. Crimped straw values obtained from WISDOT (Sprague, J., Large-Scale Slope Erosion Testing [ASTM D6459] of Crimped Straw over Sandy Loam [Madison, WI; Wisconsin Department of Transportation, November 30, 2007]).



## Let's Get Technical

HECPs are more complicated than they look. Tensar continually advances erosion control technology to ensure HydraMax™ Systems start protecting your site and promote vegetation as soon as they hit the ground. Proven time and again in the laboratory and in the field, our HydraMax mulches outperform the competition in large-scale NTPEP testing and immediately deliver crucial benefits.

A result of the HydraMax System's unique formulation is the promotion and sustainment of vegetation. With a low carbon to nitrogen ratio (less than 50:1), HydraMax HECPs require less nitrogen than wood and cellulose based mulches from the soil for decomposition, leaving more of this essential nutrient for plants. In ASTM D7322 testing, vegetation establishment increased by multiples over bare soil plots due in part to the availability of nitrogen, phosphorous, and potassium, all essential nutrients beneficial to plant growth and development.

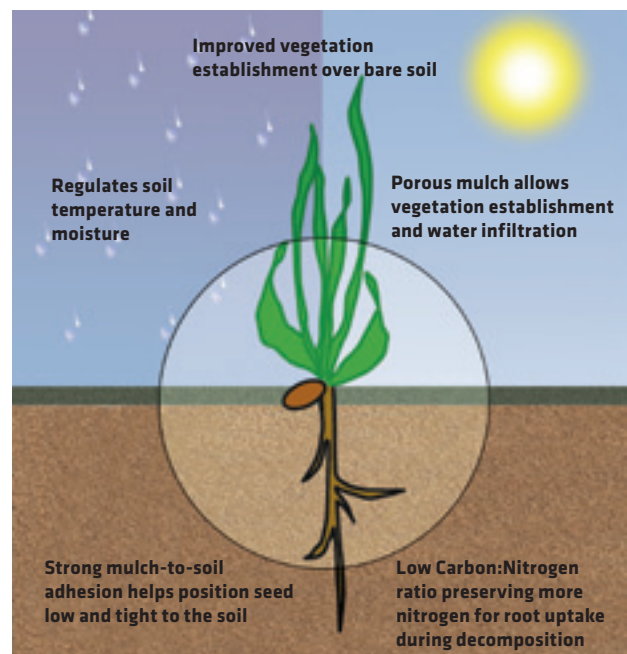
Compost Analysis Review	
Available Nitrogen	9.0 lbs/ton
Phosphate (P205)	8.0 lbs/ton
Potash (K2O)	51.8 lbs/ton
Calcium (Ca)	8.6 lbs/ton
Carbon:Nitrogen Ratio	29:1

*\*Analyses are representative and may vary from sample to sample*

Beyond protecting the site with high-performance erosion control and vegetation establishment, Tensar® HydraMax™ Systems HECPs are made of renewable natural fibers and tackifiers that won't negatively impact the environment.

- ▶ Certified 100% weed and pathogen-free through extensive heat treatment
- ▶ Reclaimed, renewable, 100% biodegradable fibers
- ▶ Contain no excessive heavy metals
- ▶ Non-toxic to aquatic wildlife as verified via EPA 2021.0 protocol
- ▶ Reduce tank loads, water usage and trips to the water source with a low water:mulch mixing ratio

## HYDRAMAX™ MULCH BENEFITS FOR GREENER DESIGN



## WHO SAYS THERE ARE NO GUARANTEES IN LIFE?

Tensar's Ultimate Assurance Guarantee gives you solid peace-of-mind in designing with and using our High-Performance series of HECPs for your critical slope protection projects. In case of an unlikely failure of HydraCX™ or HydraCM™. Tensar's Ultimate Assurance Guarantee states that if a properly specified and installed Tensar® North American Green® erosion control product designed by a qualified engineer or Tensar technical representative, in accordance with our ECMDS® software, fails to perform under the conditions set forth in the Guarantee, then we will replace the failed product with our next higher performance product. Our Guarantee warrants in accordance with its terms and conditions all registered projects designed with the latest version of our ECMDS and properly installed. And remember, using Tensar Hydraulic Erosion Control Products can help you reach your Leadership in Energy and Environmental Design (LEED®) Green Building Rating System™ project certification goals. Contact Tensar at **800-TENSAR-1** or **tensarcorp.com** or your local Tensar Erosion Control distributor for details.



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