



GGG Hydraulically-Applied Erosion Control Bonded Fiber Matrix

GENERAL

1.01 SUMMARY

- A. This section specifies a hydraulically-applied, 100% biodegradable, Bonded Fiber Matrix (BFM) that is manufactured in the United States and is composed of 100% recycled Thermally Refined™ wood fibers and naturally derived crosslinked biopolymers. The BFM may require a 24-48 hour curing period to achieve maximum performance. The BFM is phytosanitized, free from plastic netting, and when cured forms an intimate bond with the soil surface to create a continuous, porous, absorbent and flexible erosion resistant blanket that allows for rapid germination and accelerated plant growth.
- B. Related Sections: Other Specification Sections, which directly relate to the work of this Section include, but are not limited to the following:
 - 1. *Section 01 57 00 – Temporary Erosion and Sediment Control*
 - 2. *Section 31 00 00 – Earthwork*
 - 3. *Section 31 91 00 – Planting Preparation*
 - 4. *Section 32 92 00 – Turf and Grasses*

1.02 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions. Include required substrate preparation, list of materials and application rate.
- B. Certifications: Manufacturer shall submit a letter of certification that the product meets or exceeds all technical and packaging requirements.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in UV and weather-resistant factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage, weather, excessive temperatures and construction operations.

2.02 MATERIALS

- A. The BFM shall be Hydro-Blanket® BFM and conform to the following property values when uniformly applied at a rate of 3500 pounds per acre (3900 kilograms/hectare) under laboratory conditions.

Property	Test Method	Req. Value (English)	Req. Value (SI)
Physical			
Mass Per Unit Area	ASTM D6566 ¹	11.2 oz/yd ² minimum	380 g/m ² minimum
Thickness	ASTM D6525 ¹	0.12 inch minimum	3.0 mm. minimum
Wet Bond Strength	ASTM D6818 ¹	6 lb/ft	88 N/m
Ground Cover	ASTM D6567 ¹	97% minimum	97% minimum
Water Holding Capacity	ASTM D7367	1400% minimum	1400% minimum
Material Color	Observed	Green	Green
Performance			
Cover Factor ²	Large Scale Testing ⁴	0.05 maximum	0.05 maximum
% Effectiveness ³	Large Scale Testing ⁴	95 % minimum	95 % minimum
Cure time	Observed	24 – 48 hours	24 – 48 hours
Vegetation Establishment	ASTM D7322 ¹	600 % minimum	600 % minimum
Yield ⁵	Calculated	1.3 minimum	1135 minimum
Kinetic Energy Absorption Potential ⁵	Calculated	0.7 minimum	264 minimum
Environmental			
Functional Longevity ⁶	ASTM D5338	Up to 12 months	Up to 12 months
Ecotoxicity	EPA 2021.0	96-hr LC50 > 100%	96-hr LC50 > 100%
Biodegradability	ASTM D5338	100% minimum	100% minimum

1. ASTM test methods developed for Rolled Erosion Control Products and have been modified to accommodate Hydraulically-Applied Erosion Control Products.
2. Cover Factor is calculated as soil loss ratio of treated surface versus an untreated control surface.
3. % Effectiveness = One minus Cover Factor multiplied by 100%.
4. Large scale testing conducted at Utah Water Research Laboratory and Texas Transportation Institute. For specific testing information please contact a Profile technical service representative at 866-325-6262.
5. Contact a Profile technical service representative for calculation details at 866-325-6262.
6. Functional Longevity is the estimated time period, based upon ASTM D5338 testing and field observations, that a material can be anticipated to provide erosion control and agronomic benefits as influenced by composition, as well as site-specific conditions, including; but not limited to – temperature, moisture, light conditions, soils, biological activity, vegetative establishment and other environmental factors.

2.3 COMPOSITION

- A. All components of the BFM shall be pre-packaged by the Manufacturer to assure both material performance and compliance with the following values. No chemical additives with the exception of fertilizer, liming and biostimulant materials should be added to this product.

1. Thermally Processed (within a pressure vessel) Wood Fiber – 80% ± 3%
 - Heated to a temperature greater than 380 degrees Fahrenheit (193 degrees Celsius) for 5 minutes at a pressure greater than 50 psi (345 kPa)
- Cross-linked Biopolymers – 10% ± 1%
- Moisture Content – 10% ± 3%

2.04 PACKAGING

- A. Bags: Net Weight – 50 lb, UV and weather-resistant plastic film
 Pallets: Weather-proof, stretch-wrapped with UV resistant pallet cover
 Pallet Quantity: 40 bags/pallet or 1 ton/pallet

EXECUTION

3.01 SUBSTRATE AND SEEDBED PREPARATION

- A. Examine substrates and conditions where materials will be applied. Apply product to geotechnically stable slopes that have been designed and constructed to divert runoff away from the face of the slope. Do not proceed with installation until satisfactory conditions are established.
- B. Depending upon project sequencing and intended application, prepare seedbed in compliance with other specifications under Section 1.01 B

3.02 INSTALLATION

- A. Strictly comply with equipment manufacturer's installation instructions and recommendations. Use approved hydro-spraying machines with fan-type nozzle (50-degree tip). To achieve optimum soil surface coverage, apply BFM from opposing directions to soil surface. Rough surfaces (rocky terrain, cat tracks and ripped soils) may require higher application rates to achieve 100% cover. Slope interruption devices or water diversion techniques are recommended when slope lengths exceed 75 feet (23 m). Maximum slope length is for product applications on a 3H:1V slope. For application on steeper slopes, slope interruption lengths may need to be decreased based on actual site conditions. Not recommended for channels or areas with concentrated water flow. No chemical additives with the exception of fertilizer, liming and biostimulant materials should be added to this product.
- B. For Erosion Control and Revegetation: To ensure proper application rates, measure and stake area. For maximum performance, apply BFM in a two-step process*:
 1. *Step One: Apply fertilizer with specified prescriptive agronomic formulations and 50% of seed with a small amount of BFM for visual metering.*
 2. *Step Two: Mix balance of seed and apply BFM at a rate of 50 lb per 125 gallons (23 kg/475 liters) of water over freshly seeded surfaces. Confirm loading rates with equipment manufacturer. Do not leave seeded surfaces unprotected, especially if precipitation is imminent.*

**Depending upon site conditions BFM may be applied in a one-step process where all components may be mixed together in single tank loads. Consult with Manufacturer for further details.*

Best results and more rapid curing are achieved at temperatures exceeding 60°F (15°C). Curing times may be accelerated in high temperature, low humidity conditions with product applied on dry soils.

Over-application of product may inhibit germination and plant growth.

- C. Mixing: A mechanically agitated hydraulic-application machine is strongly recommended:
 1. *Fill 1/3 of mechanically agitated hydroseeder with water. Turn pump on for 15 seconds and purge and pre-wet lines. Turn pump off.*
 2. *Turn agitator on and load low density materials first (i.e. seed).*
 3. *Continue slowly filling tank with water while loading fiber matrix into tank.*
 4. *Consult application and loading charts to determine number of bags to be added for desired area and application rate. Mix at a rate of 50 lb of BFM per 125 gallons (23 kg/475 liters). Contact Equipment manufacturer to confirm optimum mixing rates.*
 5. *All BFM should be completely loaded before water level reaches 75% of the top of tank.*
 6. *Top off with water and mix until all fiber is fully broken apart and hydrated (minimum of 10 minutes — increase mixing time when applying in cold conditions). This is very important to fully activate the bonding additives and to obtain proper viscosity.*
 7. *Add fertilizer*
 8. *Shut off recirculation valve to minimize potential for air entrainment within the slurry.*
 9. *Slow down agitator and start applying with a 50-degree fan tip nozzle.*
 10. *Spray in opposing directions for maximum soil coverage.*

- D. Application Rates: These application rates are for standard conditions. Designers may wish to reduce rates to encourage faster vegetation establishment or may need to increase application rates on rough surfaces.

Slope Gradient / Condition	English	SI
≤ 4H to 1V	2500 lb/ac	2800 kg/ha
> 4H to 1V and ≤ 3H to 1V	3000 lb/ac	3400 kg/ha
≥ 3H to 1V and ≤ 2H to 1V	3500 lb/ac	3900 kg/ha
> 2H to 1V and ≤ 1H to 1V	4000 lb/ac	4500 kg/ha
> 1H to 1V	4500 lb/ac	5100 kg/ha
Below ECB or TRM	1500 lb/ac	1700 kg/ha
As infill for TRM*	3500 lb/ac	3900 kg/ha

*Use only approved and tested TRMs to create the GreenArmor™ System

3.03 CLEANING AND PROTECTION

- A. After application, thoroughly flush the tank, pumps and hoses to remove all material. Wash all material from the exterior of the machine and remove any slurry spills. Once dry, material will be more difficult to remove.
- B. Clean spills promptly. Advise owner of methods for protection of treated areas. Do not allow treated areas to be trafficked or subjected to grazing.