Milliken® Infrastructure Solutions

Concrete Cloth™

Geosynthetic Cementitious Composite Mat

STORM + SANITARY | BRIDGES + ROADWAYS | OIL, GAS + INDUSTRIAL

The Concrete Cloth™ material is a three-dimensional flexible cement impregnated fabric that hardens after hydration to form a durable concrete layer. Classified as a Geosynthetic Cementitious Composite Mat (GCCM), it is used in a variety of civil infrastructure markets including: transportation, oil & gas, stormwater, landfill, mining, and erosion control. Typical applications for use are ditch lining, slope stabilization, shoreline armor, secondary berm protection, culvert invert protection, and geosynthetic liner protection.

	MAN PORTABLE BATCH ROLLS				BULK ROLLS			
Product	**Roll Width ft (m)**	**Roll Length ft (m)**	**Roll Area ft² (m²)**	**Average Unset Roll Weight lb (kg)**	**Roll Width ft (m)**	**Roll Length ft (m)**	**Roll Area ft² (m²)**	**Average Unset Roll Weight lb (kg)**
CC5	3.63 (~1.1)	30.0 (~9.1)	108.9 (~10.1)	~156 (~71)	3.63 (~1.1)	593.8 (~181.0)	2155.5 (~200)	~3100 (~1400)
CC8	3.50 (~1.1)	15.3 (~4.7)	53.6 (~5)	~130 (~58)	3.50 (~1.1)	385.0 (~117.0)	1347.5 (~125)	~3170 (~1440)
CC13	Not Available				3.60 (~1.1)	239.0 (~72.8)	860.4 (~80)	~3355 (~1520)

Standard production size information is subject to change without notice. Please contact your Milliken representative or distributor on exact roll size quotes (sales based on ft²).
All test data are typical minimum values unless otherwise noted.

Dimensional Parameters

Product	Thickness in (mm)	Dry Weight lb/ft² (kg/m²)	Cured Weight lb/ft² (kg/m²)
CC5	0.2 (5)	1.3 (6.3)	1.7 (8.5)
CC8	0.3 (8)	2.2 (10.6)	2.8 (14.2)
CC13	0.5 (13)	3.7 (18.0)	5.0 (24.3)

Listed weights are minimum values. Actual product weight may exceed these values.

Tensile Strength: ASTM D-5035

Product	Working Strength lb/ft² (kg/m²)		Ultimate Strength lb/ft² (kg/m²)	
	Length	Width	Length	Width
CC5	60 (10)	20 (3.5)	140 (24)	50 (8.5)
CC8	85 (15)	25 (4.4)	190 (33)	100 (17)
CC13	150 (26)	90 (16)	190 (33)	110 (19)

Puncture Resistance: ASTM D-6241

Product	Puncture Strength lb (kg)
CC5	350 (160)
CC8	500 (225)
CC13	720 (325)

CC13 has also passed ASTM G-13 (Impact Resistance of Pipeline Coatings).

Permeability

- Coefficient of Permeability 2x10-11 m/s (CC8)

  Permeability of joints will vary dependent on the jointing method, consult Milliken Infrastructure Solutions or your distributor for more information.

Set Time: ASTM C-807

- Initial Set: 120 min
- Final Set: 240 min

  CC will achieve ~70% strength 24hr after hydration. Working Time 1-2 hrs after hydration.

Flex Strength: ASTM C-1185

- 7 Day Minimum: 475 psi (3.3 MPa)
- 7 Day Modulus Minimum: 26,000 psi (180 MPa)

Compressive Strength: ASTM C-473

- 7 Day Minimum: 5600 psi (38 MPa)

Taber Abrasion: ASTM C-1353

- Approximately 7.5x Greater than 2500 psi OPC

Freeze Thaw: ASTM C-1185

- 200 Cycles - Pass

Flame Resistance: MSHA ASTP-5011

- Vertical and Horizontal Certification

Manning's n Value: ASTM D-6460

- n=0.011

Permissible Shear & Velocity CC5: ASTM D-6460

- Shear <25 lb/ft2 (1200 Pa)
- Velocity <35 ft/sec (10.7 m/s)

Product Exceeded Large Scale Testing Capabilities and was not tested to failure.

To actually achieve these permissible values, the CC material must be properly anchored with a system designed to meet or exceed these values.

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MILLIKEN INFRASTRUCTURE
A Milliken COMPANY

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Composition

Concrete Cloth GCCM is a three-dimensional flexible cement impregnated fabric that hardens after hydration. The material has a top surface fabric through which water will penetrate during hydration and a bottom surface consisting of a PVC membrane that acts as permeable barrier.

Characteristics

The dry density of the product before hydration is approximately 95 lbs/ft3 (1500 kg/m3). Upon complete hydration the density increases between 30-35% to approximately 125 lbs/ft3 (2000 kg/m3). The exact density will depend slightly on the thickness of material and the relative proportion of PVC membrane to cement.

Storage & Handling

Concrete Cloth matting is sold in three (3) thickness. Standard roll sizes referred to as Bulk or Batch rolls are noted in the product table on the proceeding page. Bulk rolls will be shipped a single roll to a pallet, Batch or Custom rolls maybe shipped multiple stacked rolls to a pallet.

It is important to check the wrapping when the Concrete Cloth rolls arrive on the jobsite. Unopened packages can be stored in a dry location, off the ground, and away from moisture for up to one year. Any damage to the packaging should be repaired prior to storage using plastic wrap and tape to protect the Concrete Cloth GCCM from premature hydration.

Batch rolls are designed to be able to lift by two (2) persons. Bulk rolls will require additional handling equipment rated for the weight of the rolls. Use of a load rated spreader bar is recommended.

Subgrade Preparation

Concrete Cloth matting will generally take the shape and structure of the surface to which it is applied and imperfections in the subgrade will be visible. It is necessary that a compact and smooth subgrade be prepared to engineering specifications prior to placement. Subgrade should be prepared to the lines and tolerances of the engineering drawings for the installation. It should be clear of surface vegetation and debris. To the extent possible Concrete Cloth materials should be in direct contact with the subgrade to which it is being applied.

Installation

Concrete Cloth matting is often overlapped to create joints so installation will typically begin at the lowest point of the project and proceed up the grade. A shingled installation overlapping the rolls is used to reduce any water seepage between the overlapped rolls.

The Concrete Cloth material is designed such that the PVC back of the material will be against the subgrade in most applications. This side is water resistant and will not allow subsequent hydration if the material is installed upside down. The PVC back side is identifiable as the side with a continuous film. It is packaged such that the PVC back will be on the outside of the roll. For this reason it is important when placing Concrete Cloth materials to let the fabric off from the bottom side of the roll.

Temporary anchoring may be used on the leading edge of roll to prevent unrolling. In applications where long lengths will be let off the roll, it is good practice to allow several feet of extra material on the down-slope side of the install to allow for migration of the material in the direction of equipment movement.

After installation of the first roll or cut piece, the leading edge of the second roll or cut piece will typically be shingled over the first. If shingling is not possible, other jointing can be used. Please consult the detailed Concrete Cloth Installation Guide for further details.

Cutting

Concrete Cloth matting is designed to be cut with commonly available cutting tools. A box cutter or razor knife is generally acceptable and rotary cutters are more efficient. Always cut the material from the fabric (top) side down to minimize tearing of the PVC membrane. When possible, use a straight edge. Always wear proper hand PPE when working with cutting tools.

Overlap and Jointing

Four (4) inch overlap is typically recommended for shingling. The most common joint is an overlapped screw joint. A stainless steel #12 screw (coarse threads) is recommended 4-18 inch (typical 6) on center at least 1 inch from the overlap edge. Consult the Installation Guide for additional jointing recommendations.

Anchoring

Along all exterior edges (top, bottom & sides) of the Concrete Cloth installation, it is recommended to install a toe-in trench (minimum of 6 inches in depth) to resist migration of surface water between the Concrete Cloth material and the subgrade. The trench may vary based on the recommendation of a certified design engineer.

Some slopes, soil types and applications may require anchors or nails to stabilize the underling soil mass against internal instability. Concrete Cloth matting may be used as the non-structural facing treatment when internal anchorage conditions are required. Anchors may be installed first or the anchors can be inserted through the cloth.

Hydration

Complete hydration is critical to optimal performance. The Concrete Cloth product cannot be over hydrated and over watering is recommended. Any water source is acceptable in most circumstances.

Saturate the top surface. This will take multiple passes of a moderate spray of water from a garden hose or other source. More water will be needed as the slope of the install increases.

Insure that the material has been saturated by means of the “thumb test”, by pressing a thumb to observe water pooling at the indention.

Wait 30-60 minutes and then put a final dose of water on the material to insure complete hydration.

The material can also be hydrated by submersion for 5-10 minutes but will only have a 1-2 hour working time after hydration.

Do not jet high pressure water directly onto the surface. Do not hydrate if temperature is likely to fall below 25F (-4C) within 24hrs of initial hydration. Do not install on frozen ground. Consult the Installation Guide for additional details and pictures.

Health & Safety

The material contains cement powder which is alkaline and may cause skin irritation. Always wear proper PPE and consult the SDS for additional information.

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