

CONCRETE CANVAS™

Concrete Impregnated Fabric...

USER GUIDE



ROAD



RAIL



AGRO



OTHER



DESIGN



2011 Expert's Choice Winner
Most Innovative Product



MTP Gold Medal Award
BUDMA 2011



Material ConneXion
Material of the Year 2009

Material ConneXion®
MEDIUM AWARD
MATERIAL of the YEAR 20



Design to Improve Life Award
Nominee, 2011

Concrete Canvas™ User Guide

Concrete Canvas (CC) is a flexible, cement impregnated fabric that hardens when hydrated to form a thin, durable, water and fire proof concrete layer.

The following guide provides useful information for installers, customers and specifiers of CC. It provides an overview of useful data and techniques that can be used across a wide range of applications. The versatile nature of the material means that this document is not exhaustive and is intended for guidance purposes only.

CC Specifications

CC Types

There are 3 CC types available with the following indicative specifications:

CC Type	Thickness (mm)	Roll Width (mm)	Dry Weight (kg/sqm)	Batched Roll Coverage (sqm)	Batched Roll Length (m)	Bulk Roll Coverage (sqm)	Bulk Roll Length (m)
CC5	5	1000	7.0	10	10.0	200	200.0
CC8	8	1100	12.0	5	4.5	125	113.6
CC13	13	1100	19.0	N/A	N/A	80	72.7

Bulk Rolls / Batched Rolls

CC is available in two standard roll sizes; bulk rolls or smaller batched rolls. The quantity per roll differs between the CC types.

Bulk rolls weigh 1.6T and are supplied on 6 inch cardboard tubes which can be hung from a spreader beam and unrolled using suitable plant equipment (see below). Bulk rolls provide the fastest method of laying CC and have the additional advantage of reducing the number of joints required. Contact Concrete Canvas Ltd. for spreader beam hire.

Batched rolls are supplied on 3 inch cardboard cores with carry handles designed as a 2 to 4 man lift. All CC thicknesses can be supplied batched to custom lengths for a small additional charge.



CC Bulk Rolls



CC Batched Rolls

Shipping / Stuffing

CC bulk rolls are individually wrapped and palletised. A 20ft ISO container can typically hold 1600sqm bulk of CC5, 1250sqm of CC8 or 800sqm of CC13. All CC rolls are provided with a basic hydration guide in English within the packaging.

CC batched rolls are similarly supplied, individually wrapped in airtight PE packaging and palletised. 10 batched rolls fit on a standard 1.2 x 1.0m pallet. A 20ft ISO container can typically hold 1000sqm of CC5 or 500sqm of CC8. CC13 is not supplied as a batched roll as standard.

Example CC Applications

Some examples of applications for the different CC types are given below:

Application	CC5	CC8	CC13	Comment
Dust Suppression	●	○		Use CC8 if the area is to be regularly trafficked.
Foundation Blinding	●	○		Use CC8 for heavy duty applications.
Weather Proofing / Slope Stabilisation	●	●		Use CC5 or CC8 depending on ground conditions.
Ditch Lining	○	●	○	Use CC5 for light duty applications. Use CC8 for medium duty applications. Use CC13 for heavy duty applications.
Bund Lining	●	●	●	All thicknesses may be used depending on level of traffic.
Sandbag / Gabion Reinforcement	○	●	●	CC8 has been tested by the British Army for sandbag reinforcement.
Trackway / Flooring		●	●	Use CC8 to CC13 depending on loading or substrate.
Pipe Protection	●	●	●	All thicknesses may be used depending on protection requirements.
Cable Covering	○	○	●	All thicknesses may be used depending on protection requirements.



CC ditch lining



CC slope protection



CC pipe protection



CC trackway

Concrete Canvas™ Hydration Instructions



SPRAY THE FIBRE SURFACE WITH WATER UNTIL IT FEELS WET TO TOUCH FOR SEVERAL MINUTES AFTER SPRAYING.

Re-spray the CC again after 1 hour if:

- Installing CC5
- Installing CC on a steep or vertical surface
- Installing in warm climates

Notes:

- CC cannot be over hydrated and an excess of water is always recommended.
- Minimum ratio of water:CC is 1:2 by weight.
- Do not jet high pressure water directly onto the CC as this may wash a channel in the material.
- CC can be hydrated using saline or non-saline water.
- CC will hydrate and set underwater.
- CC has a working time of 1-2 hours after hydration. Do not move CC once it has begun to set.
- Working time will be reduced in hot climates.
- CC will set hard in 24 hours but will continue to gain strength for years.
- If CC is not fully saturated, the set may be delayed and strength reduced. If the set is delayed, re-wet with a large excess of water.

CC Hydration at Low Temperatures (<5°C)

- 1) If the ground surface temperature is between 0 and 5°C and rising, Concrete Canvas should be covered with plastic sheeting immediately after hydration. CC may exhibit a delayed set at very low temperatures.
- 2) If the surface temperature is expected to fall below 0°C in the 8 hours following hydration then use warm water (>15°C) mixed with CC accelerant (dissolve 200g/1000lt) and cover with plastic sheeting. It is important to only use accelerant supplied by Concrete Canvas Ltd. as some admixtures may delay set or impair performance of CC.
- 3) It is not recommended to install CC if the ground surface temperature is likely to fall below -4°C within 24 hours of initial hydration.
- 4) It is not recommended to install CC on frozen ground as the ground may move significantly when it thaws, creating voids underneath the set Concrete Canvas.

Storage

CC should be stored in dry conditions away from direct sunlight and in the manufacturers sealed packaging. If stored correctly CC has a shelf life of 24 months. If stored for longer CC may remain usable in many instances.

Cutting CC

Cutting Unset CC

A 'snap off' type disposable blade is the most suitable tool for cutting CC before it is hydrated or set. When cutting dry CC, a 20mm allowance should be left on the cut edge due to lost fill. This can be avoided by wetting the CC prior to cutting.



CC can also be cut using handheld self sharpening powered disc cutters.

Cutting Set CC

Set CC can be cut as with conventional concrete, with angle grinders, construction disc cutters or good quality tile cutters.

CC sheets in all three thicknesses can also be water cut to a fine resolution. Contact Concrete Canvas Ltd. for further information.



CC Mechanical Fixings

There are a large number of mechanical fixings that are suitable for use with Concrete Canvas. Some of these fixings can be used in conjunction with the non-mechanical joining methods described later in this guide to improve the mechanical strength or water proofing properties of joints.

Staples

The versatility of CC means that a wide range of manual, electric or gas powered staplers are suitable for attaching CC to soft substrates such as wooden boarding for building cladding. Commercially available hand staplers are suitable for fixing 2 layers of CC together where a small amount of compression force is required - such as with the simple overlap joint described on page 9.



Nails

Standard nails can be used to attach CC. Alternatively, a power tool such as the Hilti nail gun, provides a quick and effective method of securing CC to hard surfaces such as concrete or rock. This may be appropriate where CC is being used to recondition an existing concrete surface or for spall lining in mining applications. It is important to ensure that the nail is used with at least a 15mm washer to ensure the head does not penetrate through the surface of the Canvas.



Screws

Self tapping screws provide a quick and readily available means of attaching CC to a substrate or to itself. Typical applications include sandbag reinforcement or covering existing wooden or steel structures.



Alternatively large thread 'self drive' screws provide an excellent method of securing overlapped layers of CC together. This is ideal where a good mechanical joint is required, for applications such as slope stabilisation, dust suppression or vehicle trackway. Contact Concrete Canvas Ltd. for a recommended supplier and product specification.



CC Mechanical Fixings cont.

Hog Rings

Hog-rings are available in a wide range of sizes and can be applied to Concrete Canvas using pneumatic, electrical or hand powered tools. They provide a rapid means of securing CC either to itself or onto a wire mesh substrate such as gabion baskets. Hog-rings can also be used to attach adjacent sheets of CC together by laying the material face to face (fibre side together) and then hog-ringing at intervals along the edge. The spacing will vary depending on the level of mechanical fixing required.



Pneumatic hog-ringer fixing CC to a gabion basket



2 CC layers laid face to face and hog-ringed together



Hog-ringed CC layers opened out showing PVC surface



Hog-ringed CC layers opened out showing fibre surface

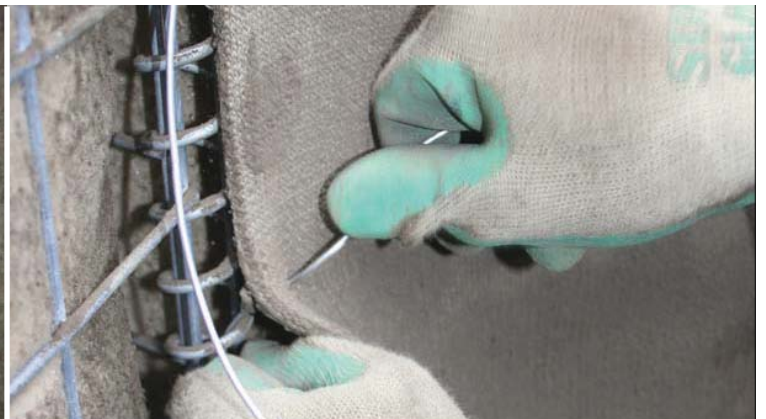
Hog Rings cont.

Water Proof Rating : ●●●○

Mechanical Strength : ●●●○

If a more water proof seal is required, a Bitumen tape can be applied over the hog-rings, onto the PVC backing, using a blow-torch. Using this method, large panels of Concrete Canvas can be prefabricated with relative ease.

Medium gauge wire can be used as a simple alternative to hog-rings where plant equipment is not available. The end of the wire should be cut to a sharp point to aid penetration through the CC layers.



Pegging

Pegging is recommended for ground surfacing applications such as ditch lining, slope stabilisation or erosion control. Typically pegs are specified every 2m for most applications, but this will vary depending on the ground conditions and application. Pegs should be used at joints where possible to secure adjacent layers together. Pegs are available directly from Concrete Canvas Ltd. in a range of sizes which are suitable for use with CC. The peg must have a sufficiently sharp point to penetrate the surface of the Canvas.



Burying CC Edges

An alternative fixing method to pegging is to bury (anchor trench) the edges of the CC with soil or aggregate. This provides a means of both fixing the material down and also ensures that surface run-off does not undermine the CC. This is particularly suitable for ditch lining, erosion control and slope stabilisation applications. It also provides a more aesthetically pleasing finish.



CC Non-Mechanical Fixings

Simple CC Overlap

Water Proof Rating : ●●○○○
Mechanical Strength : ●○○○○

Simple CC Overlap (Screwed)

Water Proof Rating : ●●○○○
Mechanical Strength : ●●●○○

Overlapping Concrete Canvas is the simplest method of joining 2 layers together. This is appropriate for the majority of ditch lining, erosion control and ground surfacing applications.

Overlapped joints should be compressed along the entire length while the material sets to ensure there are no voids between layers. This can be done using screws, sandbags, water weights, loose fill, staples etc. Overlapping CC will provide a moderate level of water proofing and is suitable for drainage applications. We recommend overlapping cut edges by a minimum of 100mm and sealed edges by a minimum of 50mm.



CC Bonding Sealant

Water Proof Rating : ●●●○○
Mechanical Strength : ●●○○○

Concrete Canvas can be joined and sealed by applying a bonding sealant between overlapping layers.

Concrete Canvas Ltd. can provide a recommended sealant which bonds to both the PVC backing and fibre surface of Concrete Canvas. A minimum bead size of 6mm should be applied along the length of the joint and the two layers firmly pushed together. The sealant works in both wet and dry conditions so can be applied before hydration or immediately after.

The bonding sealant will fully cure in 24 hours.



CC Non-Mechanical Fixings cont.

CC Jointing Grout

Water Proof Rating : ●●●●○
Mechanical Strength : ●●●●○

Concrete Canvas can be joined and sealed by overlapping layers and applying a grouting compound along the joint.

Concrete Canvas Ltd. can provide a bespoke cementitious grout called CC Jointing Grout for use in drainage and ditch lining applications. CC Jointing Grout is based on the same cementitious mix as Concrete Canvas to create a homogenous joint.

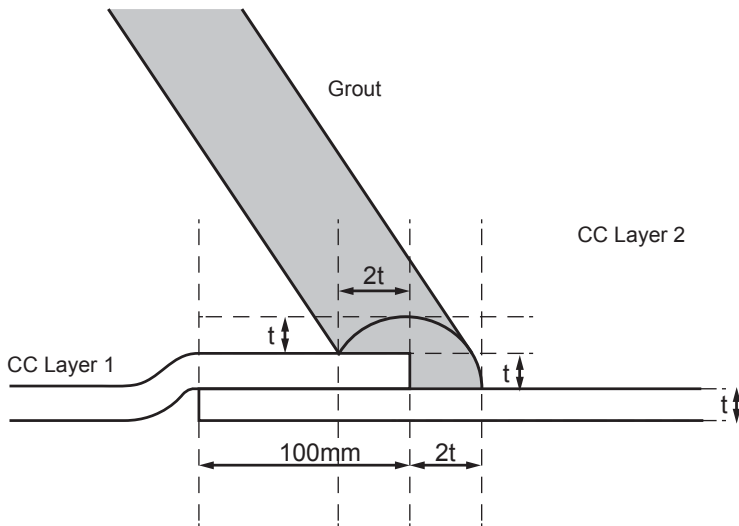
The use of other grouting compounds may retard setting time and reduce set strength, please contact Concrete Canvas Ltd. for further advice.

Grout should be applied **after** hydrating the two overlapped layers. Ensure that the bottom layer, including the overlapped area is properly hydrated.

CC Jointing Grout has similar setting characteristics to CC and initial set takes place after two hours.

After applying the grout, continue to hydrate as per CC hydration instructions, ensuring not to apply jets of water directly onto the joint to avoid washout of the grout.

Fig. 1 Recommended Minimum Coverage



When applying the grout, ensure that the coverage on each overlapping edge is at least twice that of the thickness of CC that is used. Also ensure the height of the grout is at least this thickness (see diagram above).



Fig. 2 CC5 over lapped joint with CC Grout



Fig. 3 CC8 over lapped joint with CC Grout



Fig. 4 CC13 over lapped joint with CC Grout

Finishing

The fibre surface of CC can be easily painted once set using standard exterior masonry paint. This provides a quick and simple method of improving the aesthetic appearance of CC. Alternatively, Concrete Canvas Ltd. can recommend a range of copolymer concrete surface treatments which can provide a coloured uniform finish as well as hydrophobic protection against staining and organic growth. Fire retardant paints have also been shown to be effective where thermal performance is critical.



A white cement blend of Concrete Canvas is available on request subject to minimum volumes. This blend provides a brilliant white uniform finish and is most commonly used for architectural applications. Contact Concrete Canvas Ltd. for further information.