



 **CONCRETE CANVAS[®]**
Concrete on a Roll

LOGISTICS GUIDE

 The Queen's Awards for Enterprise: International Trade 2019	 Board of Trade Winner 2016	 Winner Technical Innovation Award	 ICE Wales Cymru Project Awards	 British Board of Agrément Certified	 The CPD Certification Service Certified CPD Provider	 Corporate Member	 Proud Supporter of Exporting is Great
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RAIL	ROAD	MINING	PETROCHEM	AGRO	PUBLIC WORKS	UTILITIES	DEFENCE	DESIGN	SHELTER

1.0 Introduction

Concrete Canvas® (CC) is part of a revolutionary new class of construction materials called Geosynthetic Cementitious Composite Mats (GCCMs). It is a flexible, concrete filled geosynthetic that hardens on hydration to form a thin, durable, water proof concrete layer. Essentially, it's Concrete on a Roll™. The following guide provides useful information for those responsible for the purchasing, logistical planning and project set up of a CC installation. These guidelines are based on over ten years of experience and should be suitable for the majority of erosion control or weed suppression projects using CC. However, the versatile nature of CC means that this document is not exhaustive and is intended for guidance purposes only.

2.0 Ordering Information

2.1 Concrete Canvas® GCCM Types

CC is manufactured in three types; CC5™, CC8™ and CC13™, that are 0.2, 0.3 and 0.5in thick respectively. The three types are used for different applications and different thicknesses may be required to suit site specific loading and erosion conditions. The designer of the CC installation should specify the appropriate CC type for the application.

2.2 Roll Format

CC is available in three standard formats (roll sizes); Bulk Rolls, Batched Rolls and Wide Rolls.

Bulk Rolls are the most popular roll format and weigh between 3300 and 3530lbs. When unpackaged the rolls are approximately 4ft in diameter and supplied on 6in internal diameter cardboard cores for hanging from a suitable spreader beam and unrolling using appropriate plant.

Batched Rolls are supplied on 3in internal diameter cardboard cores with carry handles designed for a 2 to 4 person lift for small or restricted access projects. Using Batched Rolls may be less economical if the CC structure dimensions results in excessive wastage. It is often preferred to minimise wastage by cutting bespoke batched lengths on site from standard Bulk Rolls.

The Bulk Rolls can be suspended from oil drum jacks, then unrolled and cut to the site-specific batched length as required, see below.



Bulk, Batched and Wide Roll formats



Bulk Rolls can be suspended from oil drum jacks and batched on site

Wide Rolls of CC5™ and CC8™ material can be manufactured to order by factory seaming Bulk Rolls to make them '2-Wide' or '3-Wide'. Wide Rolls are shorter in length than Bulk Rolls but can provide installation advantages by reducing jointing requirements. Wide Rolls are supplied on 5in internal diameter HDPE cores for hanging from a suitable spreader beam and unrolling using appropriate plant.

All CC thicknesses can be supplied batched to custom lengths for a small additional charge.

The quantity per roll differs between the CC types as shown in the tables below.

CC Type	Thickness, in (mm)	Dry Weight, lbs/ft ² (kg/m ²)	Batched Roll			Bulk Roll		
			Width, ft (m)	Length, ft (m)	Area, ft ² (m ²)	Width, ft (m)	Length, ft (m)	Area, ft ² (m ²)
CC5™	0.2 (5)	1.43 (7)	3.28 (1.0)	33 (10)	108 (10)	3.28 (1.0)	656 (200)	2,153 (200)
CC8™	0.3 (8)	2.46 (12)	3.61 (1.1)	15 (4.55)	54 (5)	3.61 (1.1)	373 (114)	1,346 (125)
CC13™	0.5 (13)	3.89 (19)	N/A	N/A	N/A	3.61 (1.1)	239 (73)	861 (80)

CC Type	Thickness, in (mm)	Dry Weight, lbs/ft ² (kg/m ²)	2-Wide Roll			3-Wide Roll		
			Width, ft (m)	Length, ft (m)	Area, ft ² (m ²)	Width, ft (m)	Length, ft (m)	Area, ft ² (m ²)
CC5™	0.2 (5)	1.43 (7)	6.56 (2.0)	154 (47)	1,012 (94)	9.84 (3.0)	101 (31)	990 (92)
CC8™	0.3 (8)	2.46 (12)	7.22 (2.2)	84 (25)	603 (56)	10.83 (3.3)	66 (20)	710 (66)
CC13™	0.5 (13)	3.89 (19)	N/A	N/A	N/A	N/A	N/A	N/A

Note 1: The reported 'Dry Weight' of Concrete Canvas material is the palletised material weight (eg 2.46lbs/ft² for CC8™). The material itself has a lower minimum weight to achieve in-service product performance, for example CC8™ has a minimum QC pass weight of 2.15lbs/ft². Roll weights should not be used in an attempt to determine roll dimensions.

Note 2: Concrete Canvas material is manufactured and supplied per square metre and units in the above tables have been converted to imperial. Our standard Bulk Rolls and Wide Rolls have an area tolerance of +5% / -2.5%. The tolerance on the width and length of each roll is balanced to ensure the correct area is supplied.

3.0 Packaging

Concrete Canvas® hardens when exposed to water and is packaged to protect it from early hydration and curing.

CC Bulk Rolls are individually packed into a polythene bag that is vacuumed and thermally sealed to prevent moisture ingress. They are palletised individually on heat treated wooden pallets measuring 4ft x 3.5ft. Sealed rolls are protected with a cardboard layer and the entire pallet is shrink wrapped.

CC Batched Rolls are supplied individually wrapped in airtight PE packaging and palletised. 13 Batched Rolls are safely stacked to fit onto a standard 4ft x 3.5ft pallet.

Wide Rolls are individually packaged in PE wrapping that is taped and bunged at each end. Wide Rolls are not palletised as standard but can be lifted with a 3.5in diameter 'stinger pole' boom attachment or with slings that are provided with each roll.

Every roll has a unique Roll ID on the packaging and all pallets are provided a basic [Hydration Guide](#) in English. All pallets are four-way entry to enable lifting from any of the four sides. Typical packaging and labelling is shown below:



Bulk Roll packaging

4.0 Logistics

4.1 Shipping

CC is shipped in 20ft or 40ft containers to international storage hubs or direct to site. Typical container stuffing quantities and images are shown below, for full details of packing weights, dimensions and truck loading information, please refer to the [CC Shipping Information](#) and [CC Wide Roll Shipping Information](#) documents (note that metric units are used in these documents).

CC Type	Per Pallet				20ft Container			40ft Container		
	No of Rolls	Qty, ft ² (m ²)	Gross Weight, lbs (kg)	Packaged Dimensions, LxWxH ft (m)	No of Pallets	Qty, ft ² (m ²)	Gross Weight, lbs (T)	No of Pallets	Qty, ft ² (m ²)	Gross Weight, lbs (T)
Batched Rolls										
CC5™	13	1,399 (130)	2,492 (1,130)	3.5x3.9x3.8 (1.08x1.18x1.16)	10	13,993 (1,300)	24,917 (11.3)	20	27,986 (2,600)	49,833 (22.6)
CC8™	13	700 (65)	1,896 (860)	3.5x3.9x3.8 (1.08x1.18x1.16)	10	6,997 (650)	18,963 (8.6)	20	13,993 (1,300)	37,926 (17.2)
Bulk Rolls										
CC5™	1	2,153 (200)	3,583 (1,625)	3.9x3.8x4.3 (1.2x1.17x1.31)	8	17,222 (1,600)	28,665 (13.0)	16	34,445 (3,200)	57,330 (26.0)
CC8™	1	1,346 (125)	3,418 (1,550)	3.9x3.5x4.0 (1.2x1.08x1.21)	10	13,455 (1,250)	34,178 (15.5)	16	21,528 (2,000)	54,684 (24.8)
CC13™	1	861 (80)	3,418 (1,550)	3.9x3.5x4.0 (1.2x1.08x1.21)	10	8,611 (800)	34,178 (15.5)	16	13,778 (1,280)	54,684 (24.8)

CC Type	Per Roll			20ft Container		
	Qty, ft ² (m ²)	Gross Weight, lbs (kg)	Packaged Dimensions, ØxL ft (m)	Nº of Rolls	Qty, ft ² (m ²)	Gross Weight, lbs (T)
Wide Rolls						
2-Wide CC5™	1,012 (94)	1,643 (745)	1.8x7.2 (0.56x2.2)	33	33,390 (3,102)	54,243 (24.6)
2-Wide CC8™	990 (56)	1,499 (680)	1.7x7.2 (0.53x2.2)	33	32,680 (1,848)	49,392 (22.4)
3-Wide CC5™	603 (92)	1,610 (730)	1.5x10.8 (0.46x3.3)	25	15,070 (2,300)	40,352 (18.3)
3-Wide CC8™	710 (66)	1,764 (800)	1.5x10.8 (0.47x3.3)	25	17,761 (1,650)	44,100 (20.0)



Bulk Roll container loading



Batched Roll container loading



2-Wide 'side on' container loading



3-Wide 'end on' container loading

4.2 Container Unloading

All product rolls must be handled with care to avoid damage to packaging and coatings, requiring suitable mechanical plant for lifting, such as a 3T container forklift. The plant needs to fit inside the container to safely lift the weight of the pallet/Wide Roll and unload. Fork attachments are required to offload the palletised Bulk and Batched rolls. 2-Wide Rolls are loaded 'side on' and are unloaded using the slings that are provided for vertical lift and unload with a forklift. 3-Wide Rolls are loaded 'end on' and must be offloaded with a 3.5in diameter 'stinger pole' boom attachment through the central core. When unloading Wide Rolls with a stinger pole ensure the forklift has sufficient capacity at the required load centre. A standard 3-Wide Roll requires a 3T rated fork truck when lifted with stinger pole.

When unloading a container, it is recommended to inspect each pallet/roll and packaging for damage or evidence of moisture ingress. All material passing these inspections should be formally accepted by recording the roll ID number. Any damage suspected to have occurred during transit should be reported to Concrete Canvas Ltd immediately. The roll ID and nature of damage should be provided.

4.3 Storage

Prior to dispatch to site, Concrete Canvas® must be stored in the original sealed packaging, in a ventilated warehouse or a dry location away from direct sunlight. It is not recommended to store in shipping containers in direct sunlight where temperatures may exceed 104°F for prolonged periods. Pallets cannot be stacked. Wide Rolls should be stored no more than 3 high. If stored correctly, the product has a shelf life of 24 months from date of manufacture (6 months for Wide Rolls). All rolls and any perishables (such as adhesive sealant) should be dispatched on a first in, first out (FIFO) basis.

4.4 Roll Identification

Roll identification numbers are on the shipping documents and attached to the outside of every roll, but also the core. Roll ID's are structured as follows:



Roll Identification label

Product Name	Production Line Number	Thickness/Type	Date of Manufacture			
			Year	Month	Day	Hour
CC	01	08	21	05	15	10

Shelf life should be determined from the date of manufacture, not date of receipt of the rolls. In the example above, the Bulk Roll shelf life will expire on the 15th of May 2023.

It is not recommended to supply material produced from different production line numbers (01 or 02) to a single project, as although the physical properties will remain consistent the material may have a different top surface appearance.

5.0 Dispatch to Site

5.1 Delivery Vehicles

Concrete Canvas® must be delivered to the work site in covered conditions to protect the material from exposure to direct sunlight, rain or humidity. Curtain sided articulated vehicles are commonly used, alternatively flat-bed vehicles can be used providing the CC materials are protected with a waterproof tarpaulin. Site delivery rules, access restrictions and the availability of offloading equipment all need to be considered when organising an appropriate vehicle to deliver material to site.

5.2 Offloading

Concrete Canvas® must be handled with care to avoid damage to packaging and coatings, requiring suitable mechanical plant for offloading from delivery vehicles. The plant must be able to safely access, reach and lift the weight of the pallet/Wide Roll for offloading (see the table in Section 4.1 for typical full pallet/roll weights). Fork attachments are required to offload the pallets, Wide Rolls can either be offloaded with slings or a suitable rated 3.5in diameter 'stinger' pole attachment. The means of offloading must be agreed with the supplier, haulier and customer before delivery.

It is not recommended to vertically offload by using lifting chains or straps only, as they may chafe against the rolls causing damage to the packaging, which could result in early set from moisture ingress and make the CC material unusable.



Forklift unloading a curtain sider vehicle



2-Wide Roll lifting with slings



2-Wide Roll lifting with stinger

5.0 Dispatch To Site

5.3 On Site Storage

Concrete Canvas® must be stored on dry, flat, stable ground and under cover (in a dry location), away from direct sunlight. The CC must be stored in the original sealed packaging including its original pallet. Pallets cannot be stacked. In humid environments, store in a ventilated location.

Care should be taken when choosing a storage location to reduce risk of damage by vehicle movement or construction activities, but minimise double handling requirements. Providing the original packaging is not damaged and the above guidance is followed, the shelf life for material stored is up to 24 months from the date of manufacture - see Sections 4.3 and 4.4.

5.4 On Site Handling

Only use appropriate handling equipment to move the CC on site keeping material on the pallet wherever possible. The shrink wrap to Batched Roll pallets can be removed for manual handling of individual rolls, but the blue PE packaging should remain unopened until it is ready to be deployed. Take care when opening so as to not damage the CC and keep the original packaging so it can be reused if necessary.

Concrete Canvas® will start to lose performance once opened and should be used within a few days to prevent any significant degradation. After deployment any excess material remaining on a roll should immediately be resealed in its original packaging, placed on its original pallet and returned to undercover storage to extend the usage life as much as possible.

6.0 Ancillaries

Ancillary items are required during installation for both deploying and securing CC into position.

6.1 Lifting Equipment

CC Bulk Rolls and Wide Rolls must be dispensed using suitable heavy lifting machinery and spreader beam. Heavy lifting machinery needs to be capable of lifting and safely reaching the required location of CC Bulk Roll or Wide Roll deployment. Roll weights are provided in section 4.1.

Spreader beam poles, lifting chains and shackles must be appropriately rated to be used in combination with the spreader beam. Shackles are also required to enable the Bulk or Wide Roll to swivel to the desired orientation for deployment. The weight of the CC Bulk or Wide Roll, spreader beam, core pipe, chains and shackles need to be considered in lifting calculations.

Certified spreader beams for Bulk and Wide Roll deployment can be purchased from Concrete Canvas Ltd, alternatively they can be sourced or hired locally. Assembly drawings including spreader beam dimensions and weights can be provided to assist in planning lifting operations.



CC Bulk Roll dispensed from a spreader beam

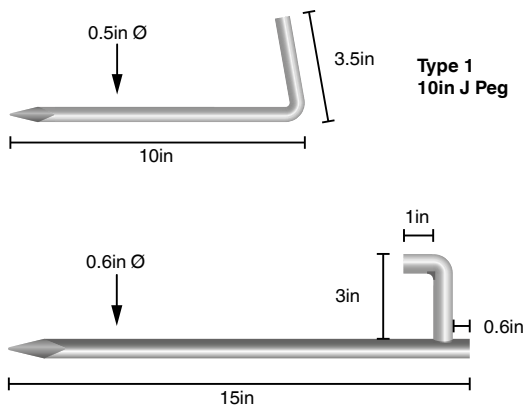
6.2 Sourcing Ancillary Fixings

Ancillary fixings are required to secure the CC into position to prevent movement under the anticipated load conditions. The choice of fixing is application, substrate and project dependent and therefore should be specified by the designer.

6.2.1 Edge Fixings: To secure the perimeter of the CC structure to the substrate.

Soil - When fixing to a soil substrate, ground pegs (e.g. J-pegs) are typically used within anchor trenches to secure the material in place prior to hydration and backfilling with non-erodible fill. Typical **J-pegs are galvanised mild steel, typically 0.5-0.6in diameter, up to 16in long and have a minimum 2in long hook**. The material used for anchor trench backfill must be able to withstand the erosion forces acting over the life of the structure. Compacted aggregate is often acceptable, but in some conditions poured concrete or polymer gabions may be specified by the designer. Backfill material may need sourcing as an ancillary item for an installation. The minimum recommended anchor trench dimension is 6x6x6in but may need to be larger to suit the design.

Rock or concrete - CC layers can be fixed to solid substrates using stainless steel masonry bolts or concrete screw anchors. Stainless steel clamping bar is recommended but the designer can specify replacing with washers when the risk of water ingress is low. The fixing specification, spacing and minimum bar dimensions or washer diameter is dependent on the fixing shear strength and must be specified by the designer.



Typical J pegs for anchor trench edge fixings



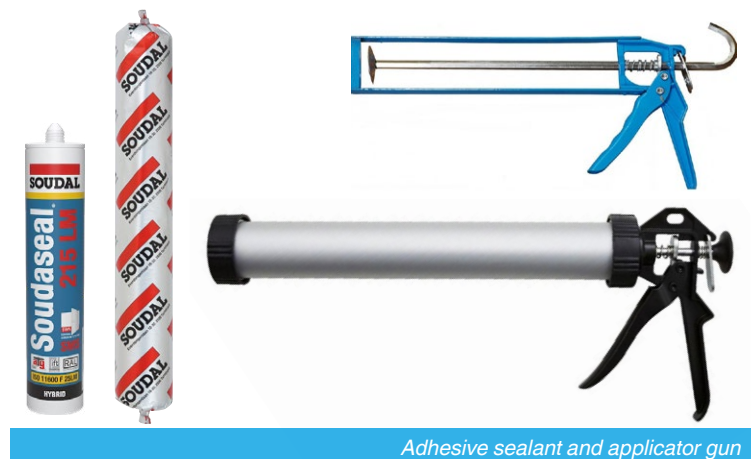
Mechanical fixings for connection to concrete

6.2.2 Jointing: To prevent gaps opening between CC layers, adjacent panels must be overlapped and joined together. This is achieved using stainless steel screws at specified intervals. Correct screw placement is essential to prevent overlap separation and ensure intimate contact between CC layers, prevent washout of the substrate and limit potential weed growth. **Screws should be grade 304 stainless steel, a minimum 0.16in diameter with a coarse, fully threaded shank with a minimum length that penetrates both CC layers** in the overlap joint (e.g. 0.6in for CC5™, 0.8in for CC8™ and 1.2in for CC13™ joints). For large projects, screws should be supplied collated and installed with an auto-fed screw gun.



Collated stainless steel screws for jointing

A **CC approved adhesive sealant or thermal bond** can be applied between the layers to increase joint strength and reduce joint permeability if necessary, but should be specified by the designer to suit the project requirements. Adhesive sealants are only recommended for use with an appropriate mechanical fixing (such as screws or concrete anchors) and are intended to reduce joint permeability or prevent weed growth between surfaces. It is important that only adhesive sealants that have been tested and approved by Concrete Canvas are used. A full list of approved CC sealants can be provided on request. Concrete Canvas Ltd approval of a particular adhesive sealant is based on the long-term mechanical durability, and the designers/installer should check the sealant safety data sheet and technical data sheet to confirm that it is suitable for site specific conditions such as risk of contamination or harm to aquatic life. Adhesive sealants have a shelf life and it is not recommended to use products past their expiry date.



Adhesive sealant and applicator gun

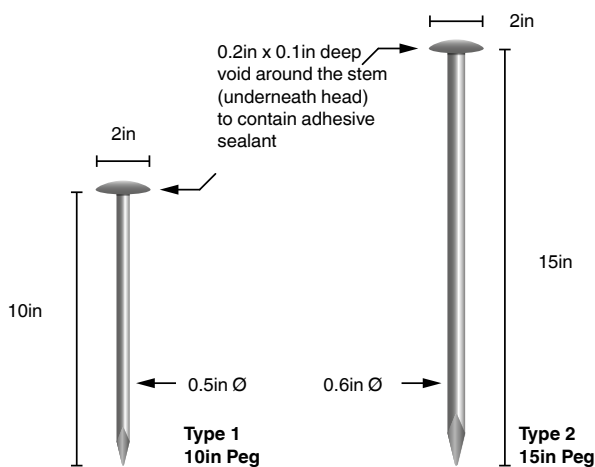
6.2.3 Intermediate Fixings: Additional ancillary fixings may be necessary to profile CC on uneven substrates to ensure it conforms to the underlying surface, or to resist the following load conditions:

- Hydraulic Shear Loads: e.g. lining channels with an incline >10%
- Wind Loads: e.g. in exposed locations where bund slope lengths exceed 23ft
- Warmer Climate Detailing: e.g. where CC profile lengths exceed 10ft

The intermediate fixing type, performance requirements and installation locations should be specified by the designer to suit the anticipated load conditions. Installers should consult the designer if intermediate fixings are required for profiling to agree the most appropriate fixing to use. More information on intermediate fixing design can be found in the [CC Specification Guides](#).

Typical intermediate fixings for soil substrates include ‘round head’ fixing pegs for profiling or warmer climate detailing. These should be galvanised mild steel, typically 0.5-0.6in diameter, up to 16in long and have a minimum 2in diameter head. A recess can be incorporated to the underside of the head to contain a bead of adhesive sealant to minimise water ingress through the hole created by the peg.

When a greater head plate diameter or pull-out strength is required, for example when designing to resist hydraulic shear or wind uplift, larger intermediate fixings such as Earth Percussion Anchors may be specified.



Typical ‘round head’ fixing peg dimensions



Earth percussion anchor intermediate fixing

6.2.4 Handling of Ancillary Products

Concrete Canvas Ltd keep a stock of ancillary items, the table below provides typical packaged dimensions and weights for planning transport and handling on site, including details for individual Batched Rolls.

Product	Unit	Dimensions (inches)			Approximate Weight (lbs)
		Length	Width	Height	
CC5™ Batched Roll	Per Roll	47	14	14	154
CC8™ Batched Roll	Per roll	47	14	14	132
Collated Screws	Box of 1000	22	5	2	4
Soudaseal 250XF Sealant 10Fl oz Cartridge	Box of 12	9	6	9	18
Soudaseal 250XF Sealant 20Fl oz Sausage	Box of 12	15	9	7	24
10 inch J Peg	Box of 40	5	10	11	29
15 inch J Peg	Bundles of 10	17	8	5	33
15 inch Round Head Peg	Box of 25	17	8	5	33
Spreader Beam - Bulk Rolls	Item	60	9	4	128
Spreader Beam - 2-Wide	Item	105	9	7	291
Spreader Beam - 3-Wide	Item	144	11	8	512

6.3 Ancillary Fixings for Other Applications

Concrete Canvas® is a versatile product and is used for a variety of applications, so other ancillary fixings may be required to secure the material to substrates other than soil or concrete/rock. For example, self-drilling tech screws may be suitable for securing to steel culverts or hog-rings may be suitable for fastening to gabions.

6.4 Water for hydration

Concrete Canvas® materials must be actively hydrated to harden and it is not advised to rely on rainfall alone for hydration. CC cannot be over hydrated and will cure underwater. Potable water is not necessary, salt water can be used. Follow the guidance in the [CC User Guide: Hydration](#), which provides specific climatic advice. Do not use high pressure water directly on the CC as this may wash a channel in the material. Water must be sourced or made available for active hydration. The minimum water requirement is half by dry metric weight as in the table below.

CC Type	Dry weight, lbs/ft ² (kg/ft ²)	Minimum Hydration Water Required, US gal/ft ² (Litres/m ²)
CC5™	1.43 (7)	0.10 (3.5)
CC8™	2.46 (12)	0.15 (6)
CC13™	3.89 (19)	0.25 (9.5)

7.0 Equipment









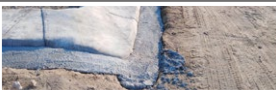


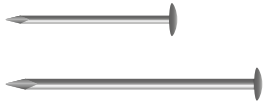
The typical Equipment List is presented overleaf and is suitable for the majority of installations. If any ancillaries or listed equipment is unsuitable for your application, consult the designer and relevant [CC Specification Guides](#) for more information.

Concrete Canvas® does not require specialist contractors for the majority of applications. Installation is quick and easy, provided that design specifications, construction drawings and installation guidelines are followed and appropriate equipment is used.

There are five steps to all CC installations which must be followed:

1. Substrate Preparation, 2. Deployment, 3. Fixing, 4. Jointing, 5. Hydration

Equipment needs will vary from project to project but the following is suitable for the majority of installations.

1. SUBSTRATE PREPARATION		Required equipment			
CC will follow the contours of the structure it is placed upon, which must be stable, free from vegetation, rocks and protrusions and have a smooth profile					
1. SUBSTRATE PREPARATION	Profiling IF REQUIRED	A smooth and uniform subgrade should be prepared excavators or hand tools. For large channelling works, a 'V' bucket can be used to create the required profile.	Excavator (& 'V' Buckets if required, or hand tools)		<input checked="" type="checkbox"/>
	Filtration / Protection Layer	Installing a suitable geotextile on the prepared surface can prevent washout of fines through unwanted seepage paths (that may cause erosion under the CC), provide a clean working area and protect the PVC backing from snags and installation damage. Check designer requirements	Suitable geotextile		<input checked="" type="checkbox"/>
2. DEPLOYMENT		Required equipment			
Bulk Rolls of CC weigh approximately 3300-3530lbs. Appropriate plant for handling and deployment of heavy goods is required on site					
2. DEPLOYMENT	Delivery & Handling AND	A mechanical means of offloading and transporting palletised heavy goods is required.	4500lbs rated tele-handler (or similar with fork attachment)		<input checked="" type="checkbox"/>
	Deployment	Bulk rolls of CC are typically deployed via plant mounted spreader beams (rated to 4500lbs SWL) in a similar fashion to conventional geosynthetics	4500lbs rated spreader beam		<input checked="" type="checkbox"/>
	Cutting (Small Projects <1000ft²) OR	CC can be cut using basic hand tools. The cement dust within the material will blunt blades so replaceable or disposable knives are recommended	Snap-off-blade utility knife		<input checked="" type="checkbox"/>
	Cutting (Large Projects >1000ft²)	For larger projects with numerous cuts required, a cutting power tool such as an angle grinder or disc cutter is recommended	Angle grinder / disc cutter (cordless recommended)		<input checked="" type="checkbox"/>
3. FIXING		Required equipment			
Deployment the CC must be secured to the substrate to prevent movement during use. The following fixings can be used depending on the substrate and design requirements					
3. FIXING	Edge Fixing in Soil Substrates OR	The entire perimeter of the CC installation must be buried in anchor trenches that are backfilled with non-erodible material to prevent undermining. J-pegs can be used to improve pull out resistance and secure the CC in place during deployment and prior to backfilling	Steel J-pegs (galvanised or stainless steel recommended)		<input checked="" type="checkbox"/>
			Lump Hammer (or similar)		<input checked="" type="checkbox"/>
			Non-erodible backfill (soil or concrete depending on design)		<input checked="" type="checkbox"/>
	Edge Fixing in Concrete or Rock Substrates IF REQUIRED	The entire perimeter of the CC installation must be secured to the substrate to prevent undermining. Stainless steel anchors must be used with clamping bar or washers. The frequency and diameter of the washer depends on the shear strength of the fixing and is project specific. A means of installing the fixing is required	Stainless Steel Fixings (e.g. masonry bolts, screw anchors >0.6in washer)		<input checked="" type="checkbox"/>
Drill and Torque Driver (including drills, bits and sockets)			<input checked="" type="checkbox"/>		
Intermediate Fixings (if required for profiling, warm climate detailing or as part of design)	Intermediate fixings may be required for to ensure the CC conforms to the underlying surface, prevent movement in warmer climates or resist external loading from hydraulic shear or wind uplift. The intermediate fixing type depends on the requirements. For profiling and drying conditions, round head pegs can be used. For external loading conditions, fixings should be specified by the designer	'Round Head' fixings to suit design and substrate conditions (e.g. galvanised pegs, earth percussion anchors or mechanical fixings & washers)		<input checked="" type="checkbox"/>	

4. JOINTING	CC layers are overlapped by 4in in the direction of water flow and jointed using any of the any of the following options. Jointing methods are specified by the designer. See the relevant CC Specification Guides and individual application user guides for further details.		Required equipment		
	OR	Screws This joint is suitable for the majority of applications and is fast and simple to apply. It provides good mechanical strength but with limited impermeability. The screws should be applied at 2-8in spacings (as specified in the design) and 1.2-2in from the edge of the CC. Important: Hydrate the CC under the overlap before jointing.	Auto-fed screwdriver (cordless recommended)		<input checked="" type="checkbox"/>
			Collated Screws (stainless steel recommended)		<input checked="" type="checkbox"/>
	OR	Screws and Sealant For applications where improved impermeability is required, an 0.3in bead of adhesive sealant can be applied in the overlap, following the position of the screws to minimise leakage. Suitable CC approved adhesive sealants are available from Concrete Canvas Ltd. Important: Hydrate the CC under the overlap before jointing.	In addition to the above		
			Caulking gun (powered unit recommended)		<input checked="" type="checkbox"/>
OR	Thermal Bonding For applications where non-penetrative jointing is required. The joint can be formed using hand welders or using an automatic thermal welding machine. The latter allows joints to be formed at a rate of 40-60in/min. Consult the CCUSA User Guide: Thermal Bonding for more information. Important: Thermal Bonding must be carried out in dry conditions prior to hydration.	Adhesive Sealant Cartridge (use CC approved adhesive sealant)		<input checked="" type="checkbox"/>	
		Leister Twinny S of T (2in solid wedge set up) or Leister Triac AT with 2.4in perforated slot nozzle		<input checked="" type="checkbox"/>	

5. HYDRATION	Following deployment and fixing, it is required to hydrate the CC. This must be proactively done and it is not advised to rely on hydration from rainfall. See CC User Guide: Hydration for further details.		Required equipment		
	OR	Mains Water Supply A minimum volume of water equal to 50% of the material weight is required and an appropriate means of application	Mains water supply		<input checked="" type="checkbox"/>
			Water Bowser A water bowser can be used as an alternative means of hydration if access to mains water supply is unavailable	Water Bowser (or similar alternative)	
	AND	Hosing Adequate length of hosing is required to hydrate the entire area of the CC structure. A Spray nozzle is needed. No focussed jets	Petrol/diesel water pump		<input checked="" type="checkbox"/>
			Adequate length hosing and spray nozzle		<input checked="" type="checkbox"/>
IF REQUIRED	Temporary Protection If installation continues the following working day, protect the edge of the last layer with a waterproof sheeting and temporary ballast prior to hydrating the rest of the structure	Waterproof sheeting and temporary ballast		<input checked="" type="checkbox"/>	

Personal Protective Equipment (PPE)

PPE is required for handling CC, consult the [CCUSA SDS](#) document. Dust Hazard.

The equipment required for a specific CC installation should be risk assessed and the installers must be provided with appropriate PPE to use the required tools.

