



 **CONCRETE CANVAS®**
Concrete on a Roll

 **CCHYDRO™**
Containment on a Roll

LOGISTICS GUIDE



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™ and is used for a variety of erosion control applications including the rapid lining of drainage channels, providing slope protection, weed suppression, culvert repair and concrete remediation.

CC Hydro™ (CCH) is a Geosynthetic Cementitious Composite Barrier (GCCB) and combines the company's GCCM technology with a high impermeability, chemically resistant geomembrane backing. This high-performance barrier is thermally welded together with an air channel for on-site testing and is used for containment critical applications.

The following guide provides useful information for those responsible for the purchasing, logistical planning and project set up of a CC or CCH 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 and CCH. However, the versatile nature of CC and CCH means that this document is not exhaustive and is intended for guidance purposes only.

2.0 Ordering Information

2.1 Concrete Canvas® GCCM and CC Hydro™ GCCB Types

CC is manufactured in three types; CCT1™, CCT2™ and CCT3™ and CC Hydro™ is manufactured in two types: CCHT1™ and CCHT2™. The types are used for different applications in accordance with ASTM D8364 – Standard Specification for GCCM Materials and different types may be required to suit site specific loading and erosion conditions. The designer of the CC/CCH installation should specify the appropriate CC/CCH type for the application.

2.2 Roll Format

CC is available in three standard formats (roll sizes); Bulk Rolls, Batched Rolls and Wide Rolls. CC Hydro™ is available in Bulk Roll format only.

Bulk Rolls are the most popular roll format and weigh between 1.5 and 1.6 tonnes. When unpackaged the rolls are approximately 1.2m in diameter and supplied on 150mm internal diameter cardboard cores for hanging from a suitable spreader beam and unrolling using appropriate plant.

Batched Rolls are supplied on 75mm 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 CCT1™ and CCT2™ 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 126mm internal diameter HDPE cores for hanging from a suitable spreader beam and unrolling using appropriate plant.

All CC and CC Hydro™ types can be supplied batched to custom lengths for a small additional charge.

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

CC Type	Thickness (mm)	Dry Weight (kg/m ²)	Batched Roll			Bulk Roll		
			Width (m)	Length (m)	Area (m ²)	Width (m)	Length (m)	Area (m ²)
CCT1™	5	8	1.0	10	10	1.0	170	170
CCT2™	7	12	1.1	4.55	5	1.1	114	125
CCT3™	11	19	N/A	N/A	N/A	1.1	73	80
CCHT1™	6	9	N/A	N/A	N/A	1.0	150	150
CCHT2™	8	13	N/A	N/A	N/A	1.0	100	100

CC Type	Thickness (mm)	Dry Weight (kg/m ²)	2-Wide Roll			3-Wide Roll		
			Width (m)	Length (m)	Area (m ²)	Width (m)	Length (m)	Area (m ²)
CCT1™	5	8	2.0	53.5	107	3.0	31.3	94
CCT2™	7	12	2.2	25	56	3.3	20	66
CCT3™	11	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 12kg/ m² for CCT2™). The material itself has a lower minimum weight to achieve in-service product performance, for example CCT2™ has a minimum QC pass weight of 10.5kg/m². Roll weights should not be used in an attempt to determine roll dimensions.

Note 2: Concrete Canvas materials are supplied per square metre and 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® and CC Hydro™ hardens when exposed to water and is packaged to protect it from early hydration and curing.

CC and CCH 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 1.2m x 1.0m. 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 1.2m x 1.0m pallet.

CC 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 90mm 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 with 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:



4.0 Logistics

4.1 Shipping

CC and CCH 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](#) document.

CC Type	Per Pallet				20ft Container			40ft Container		
	No of Rolls	Qty (m ²)	Gross Weight (kg)	Packaged Dimensions LxWxH (m)	No of Pallets	Qty (m ²)	Gross Weight (Tonne)	No of Pallets	Qty (m ²)	Gross Weight (Tonne)
Batched Rolls										
CCT1™	13	130	1140	1.08x1.18x1.16	10	1300	11.4	20	2600	22.8
CCT2™	13	65	860	1.08x1.18x1.16	10	650	8.6	20	1300	17.2

CC Type	Per Roll				20ft Container			40ft Container		
	Qty (m ²)	Gross Weight (kg)	Packaged Dimensions ØxL (m)	Nº of Rolls	Qty (m ²)	Gross Weight (Tonne)	No of Pallets	Qty (m ²)	Gross Weight (Tonne)	
Bulk Rolls										
CCT1™	1	170	1600	1.2x1.17x1.31	8	1360	12.8	16	2720	25.6
CCT2™	1	125	1550	1.2x1.08x1.21	10	1250	15.5	16	2000	24.8
CCT3™	1	80	1550	1.2x1.08x1.21	10	800	15.5	16	1280	24.8
CCH1™	1	150	1455	1.2x1.17x1.31	10	1500	14.5	17	2550	24.7
CCH2™	1	100	1390	1.2x1.08x1.21	10	1000	13.9	18	1800	25.0

CC Type	Per Roll			20ft Container		
	Qty (m ²)	Gross Weight (kg)	Packaged Dimensions ØxL (m)	Nº of Rolls	Qty (m ²)	Gross Weight (Tonne)
Wide Rolls						
2-Wide CCT1™	94	745	0.56x2.2	33	3102	24.6
2-Wide CCT2™	56	680	0.53x2.2	33	1848	22.4
3-Wide CCT1™	92	730	0.46x3.3	25	2300	18.3
3-Wide CCT2™	66	800	0.47x3.3	25	1650	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 90mm 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 0.8T 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® and CC Hydro™ 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 40°C 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	Type	Date of Manufacture			
			Year	Month	Day	Hour
CC	01	T2	22	06	09	07

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 9th of June 2024.

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

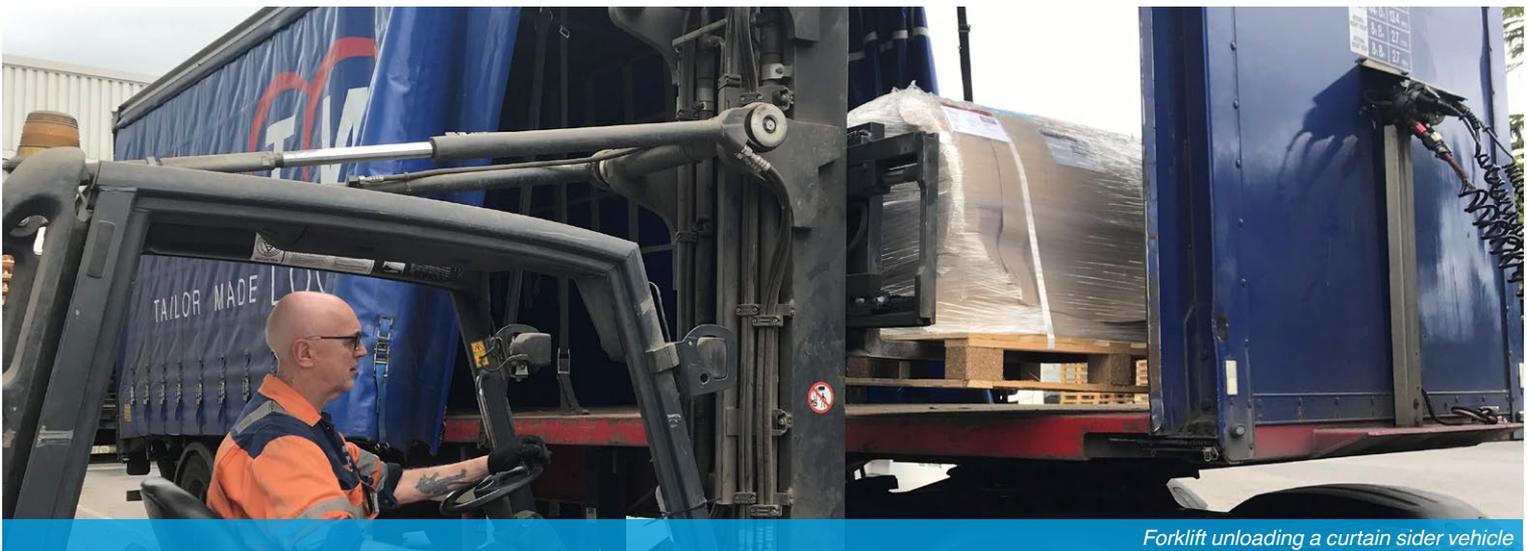
5.1 Delivery Vehicles

Concrete Canvas® and CC Hydro™ 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/CCH 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® and CC Hydro™ 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 90mm 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/CCH 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® and CC Hydro™ must be stored on dry, flat, stable ground and under cover (in a dry location), away from direct sunlight. The CC/CCH 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/CCH 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 clear PE packaging should remain unopened until it is ready to be deployed. Take care when opening so as to not damage the CC/CCH and keep the original packaging so it can be reused if necessary.

Concrete Canvas® and CC Hydro™ 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/CCH into position.

6.1 Lifting Equipment

CC/CCH Bulk Rolls and CC 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 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 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

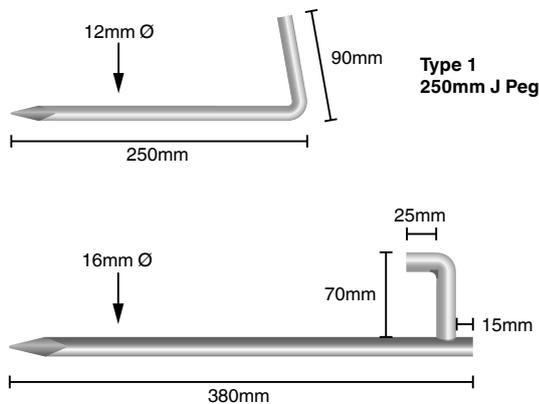
6.2 Sourcing Ancillary Fixings

Ancillary fixings are required to secure the CC/CCH 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/CCH 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 12-16mm diameter, up to 400mm long and have a minimum 50mm 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 150x150x150mm but may need to be larger to suit the design.

Rock or concrete - CC/CCH layers can be fixed to solid substrates using stainless steel masonry bolts or concrete screw anchors. Stainless steel clamping bar and flexible gasket is recommended for CCH, but for CC the designer may 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.

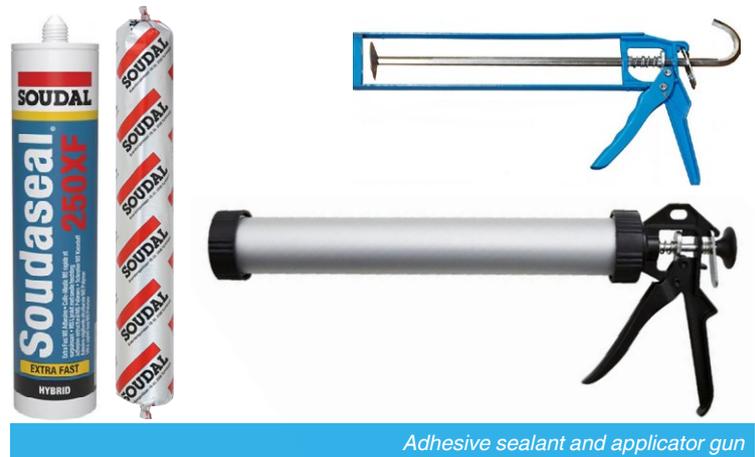
6.2.2.1 Jointing of Concrete Canvas® GCCM:

Jointing 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 4mm diameter with a coarse, fully threaded shank with a minimum length that penetrates both CC layers in the overlap joint (e.g. 15mm for CCT1™, 20mm for CCT2™ and 30mm for CCT3™ joints). For large projects, screws should be supplied collated and installed with an auto-fed screw gun.



Collated stainless steel screws for jointing

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

6.2.2.2 Jointing of CC Hydro™ GCCB:

Jointing is achieved by thermal welding of the geomembrane backing. This requires the installers to be suitably trained, experienced and qualified for welding geomembranes using automated hot air welders. For more information on the thermal welding process and the additional tolls/equipment required, refer to the [CCH User Guide: Thermal Welding](#). Concrete Canvas Ltd can provide additional 200mm and 1000mm wide PVC geomembrane for CCH joint repairs, to create welding strips for pie welds or jointing cut edges, or for bespoke detailing. It is recommended to order additional geomembrane as part of the main order for the CCH Bulk Rolls.

6.2.3 Intermediate Fixings:

6.2.3.1 For Concrete Canvas® GCCM:

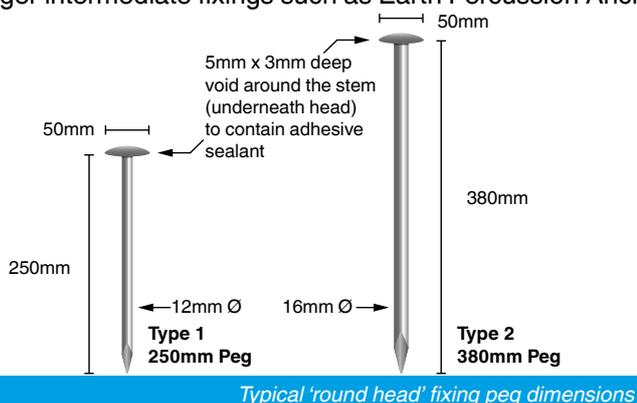
Additional ancillary fixings may be necessary to profile CC on uneven substrates to ensure it conforms to the underlying surface, or to resist the following load conditions:

- Hydraulic Shear Loads: e.g. lining channels with an incline >10%
- Wind Loads: e.g. in exposed locations where bund slope lengths exceed 7m
- Warmer Climate Detailing: e.g. where CC profile lengths exceed 3m

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 12-16mm diameter, up to 400mm long and have a minimum 50mm 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

6.2.3.2 For CC Hydro™ GCCB:

Intermediate fixings may also be required on CCH structures, in particular on large banded structures where slope lengths exceed 20m, but the intermediate fixing must be carefully detailed to prevent liquid loss through the intermediate fixing. Typically, the CCH is captured in an intermediate anchor trench which is backfilled with poured concrete, or when lining concrete substrates clamping bar, gasket and mechanical fixings are used.

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 (m)			Approximate Weight (kg)
		Length	Width	Height	
CCT1™ Batched Roll	Per Roll	1.2	0.35	0.35	70
CCT2™ Batched Roll	Per roll	1.2	0.35	0.35	60
Collated Screws	Box of 1000	0.56	0.12	0.05	2
Soudaseal 250XF Sealant 290ml Cartridge	Box of 12	0.24	0.16	0.22	8
Soudaseal 250XF Sealant 600ml Sausage	Box of 12	0.37	0.22	0.17	11
250mm J Peg	Box of 40	0.12	0.25	0.27	13
380mm J Peg	Bundles of 10	0.42	0.15	0.15	7
380mm Round Head Peg	Box of 25	0.42	0.21	0.13	15
Spreader Beam - Bulk Rolls	Item	1.53	0.23	0.1	58
Spreader Beam - 2-Wide	Item	2.66	0.22	0.18	132
Spreader Beam - 3-Wide	Item	3.65	0.29	0.2	232

6.3 Ancillary Fixings for Other Applications

Concrete Canvas® and CC Hydro™ are versatile products 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/CCH cannot be over hydrated and will cure underwater. Potable water is not necessary, salt water can be used but the pH must be above 6.0. Follow the guidance in the [CC User Guide: Hydration](#), which provides specific climatic advice. Do not use high pressure water directly on the CC/CCH as this may wash a channel in the material. Water must be sourced or made available for active hydration. The minimum water requirement is 40% by dry weight as in the table below.

CC Type	Dry Weight (kg/m ²)	Minimum Hydration Water Required (litres/m ²)
CCT1™/CCH1™	8	3.5
CCT2™/CCH2™	12	5
CCT3™	19	7.5

7.0 Equipment

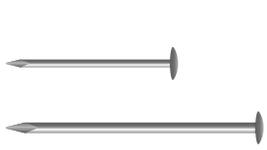
The typical Equipment List is presented overleaf and is suitable for the majority of CC installations. For CC Hydro™, the equipment required for the thermal weld jointing is found in the [CCH User Guide: Thermal Welding](#). If any ancillaries or listed equipment is unsuitable for your application, consult 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 1.5-1.6T. Appropriate plant for handling and deployment of heavy goods is required on site					
2. DEPLOYMENT	Delivery & Handling	A mechanical means of offloading and transporting palletised heavy goods is required.	2T rated telehandler (or similar with fork attachment)		<input checked="" type="checkbox"/>
	AND				
	Deployment	Bulk rolls of CC are typically deployed via plant mounted spreader beams (rated to 2T SWL) in a similar fashion to conventional geosynthetics	2T rated spreader beam		<input checked="" type="checkbox"/>
	AND				
Cutting (Small Projects <100m ²)	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"/>	
OR					
Cutting (Large Projects >100m ²)	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	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	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 >15mm washer)		<input checked="" type="checkbox"/>
			Drill and Torque Driver (including drills, bits and sockets)		<input checked="" type="checkbox"/>
IF REQUIRED	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 100mm 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 50-200mm spacings (as specified in the design) and 30-50mm 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 8mm 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"/>
Adhesive Sealant Cartridge (use CC approved adhesive sealant)				<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 1-1.5m/min. Consult the CC User Guide: Thermal Bonding for more information. Important: Thermal Bonding must be carried out in dry conditions prior to hydration.	Leister Twinny S of T (50mm solid wedge set up) or Leister Triac AT with 60mm 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 40% 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)		<input checked="" type="checkbox"/>
	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	
	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		Adequate length hosing and spray nozzle	
		Waterproof sheeting and temporary ballast		<input checked="" type="checkbox"/>	

Personal Protective Equipment (PPE)

PPE is required for handling CC and CCH, consult the [CC & CCH 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.

