



 **CONCRETE CANVAS®**
Concrete on a Roll

**INSTALLATION GUIDE:
WEED SUPPRESSION**



RAIL



ROAD



MINING



PETROCHEM



AGRO



PUBLIC WORKS



UTILITIES



DEFENCE



DESIGN



SHELTER

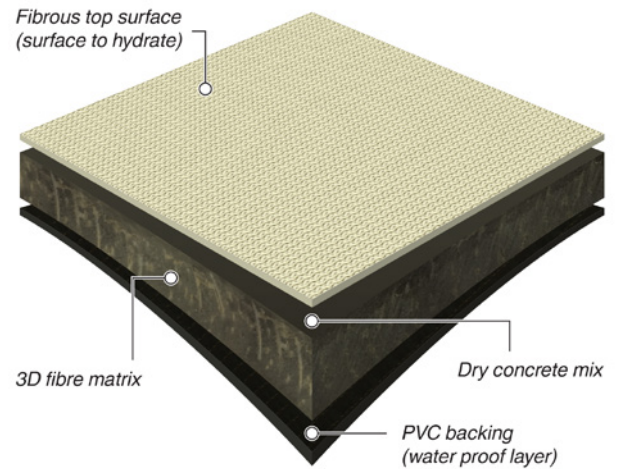
1.0 Introduction

1.1 Background

Concrete Canvas® 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 and fire resistant concrete layer.

Essentially, it can be described as ‘concrete on a roll’ and is used for a wide variety of applications including the rapid lining of drainage channels, providing slope protection, weed suppression, culvert repair and general concrete remediation.



1.2 Scope

- This document provides guidance procedures for the installation of Concrete Canvas® GCCM (CC) as **weed suppression** in a manner that maximises safety, efficiency, and resistance to vegetation growth.
- This document provides useful information for installers, customers and specifiers of CC and provides an overview of installation techniques for the lining of weed affected areas including around sensitive infrastructure such as under pipe bands/tracks, road or track side critical visibility points and to perimeter security fencing.
- The versatile nature of CC means that this document is not exhaustive and is intended for guidance purposes only. Exceptions to this guideline may be required to address site-specific and/or product-specific conditions.
- The performance of the CC is wholly dependent on the quality of its installation. It is the installer’s responsibility to adhere to these guidelines where applicable and to the project specification and drawings.



CC Weed Suppression, Yamanashi, Japan

2.0 Specification and Installation Essentials

2.1 Specifying the Correct CC Thickness

CC is available in 3 thicknesses, CC5™ (5mm), CC8™ (8mm) and CC13™ (13mm).

- CC5 is the standard thickness specified for weed suppression and is recommended unless either of the conditions below apply.
- CC8 is used for weed suppression installations where the coverage area is likely to experience infrequent pedestrian trafficking such as during maintenance works, or is providing additional protection against small animal damage (i.e rabbit, vole, wasp), or acting as a water channel in addition to providing weed suppression.
- CC13 is used for weed suppression installations where the coverage area is likely to experience regular pedestrian trafficking, or is providing additional protection against larger animal damage.

CC Type	Thickness (mm)	Roll Width (m)	Dry Weight (kg/m ²)	Batched Roll Coverage (m ²)	Batched Roll Length (m)	Bulk Roll Coverage (m ²)	Bulk Roll Length (m)
CC5™	5	1.0	7	10	10	200	200
CC8™	8	1.1	12	5	4.55	125	114
CC13™	13	1.1	19	N/A	N/A	80	73

Table 1. Concrete Canvas Physical Data

2.2 Specifying the Correct CC Roll Format

CC is available in Bulk Rolls, Batched Rolls or Wide Rolls.

- **Bulk Rolls** offer a quicker installation than Batch Rolls, but must be deployed using heavy lifting equipment and a spreader beam. Bulk Rolls are generally more efficient to use than Batched Rolls, in terms of material use and transportation.
- For sites where this isn't suitable, man portable **Batched Rolls** can be installed without the need for plant and are well suited to smaller scale works in restricted access areas.
- CC is also available in **Wide Rolls** of up to 3 times the standard roll width. Contact Concrete Canvas for further details.



CC is available in Bulk, Batched and Wide Rolls

2.0 Specification and Installation Essentials

2.3 Specifying the Correct CC Layup

CC is supplied in roll lengths of up to 200 linear metres and can be laid longitudinally or transversely relative to the asset (railway line, road, fence or pipe line).

Long narrow coverage areas can be lined in a single 1.0 or 1.1m longitudinal layer of CC, whereas wider coverage areas would be laid in a series of overlapped transverse layers.

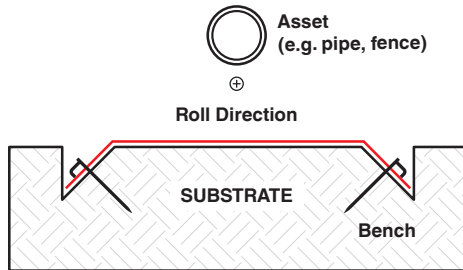


Longitudinal Layup

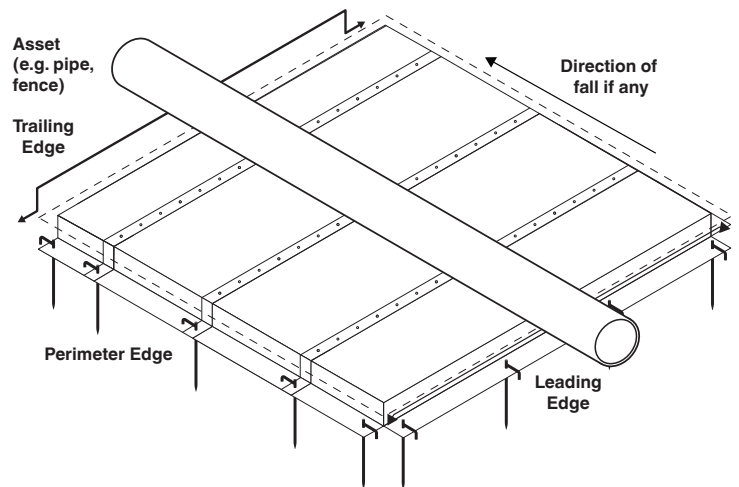
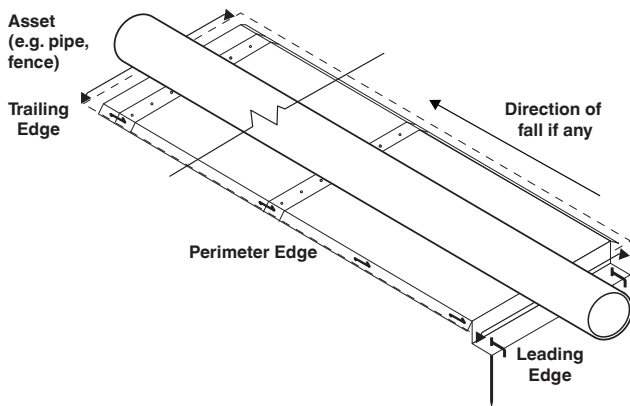
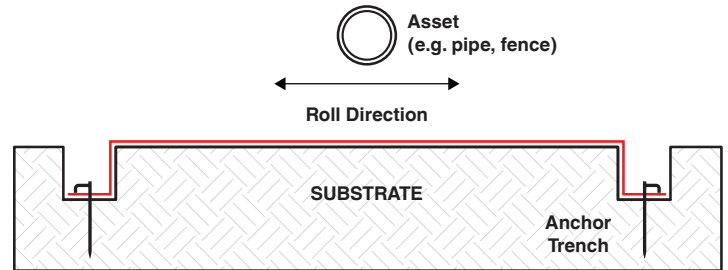


Transverse Layup

Longitudinal Deployment



Transverse Deployment



2.4 Edge Fixing

All CC edges must be secured in place and buried to prevent wind/water ingress which could lead to uplift. Material should be secured in place using appropriate fixing pegs to suit the substrate and any penetration depth limitations.

2.0 Specification and Installation Essentials

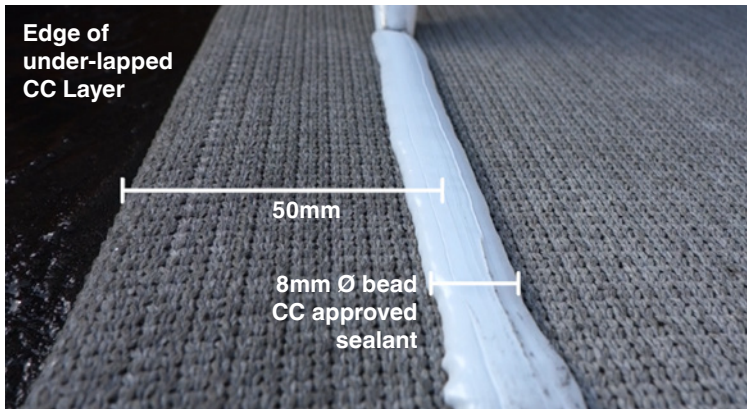
2.5 Jointing

CC layers should be overlapped by a minimum of 100mm (in the direction of water run-off if applicable) and secured together using stainless steel screws to ensure intimate contact along each joint. To prevent weed growth, a CC approved adhesive sealant must be applied between overlapped layers using a caulking gun. This is applied as a single 8mm bead located 50mm from the edge of the under-lapped CC layer. An 8mm bead is equivalent to a coverage of 50g/m which is equivalent to 5.8m of joint for a 290ml cartridge or 12m of joint from a 600ml foil.

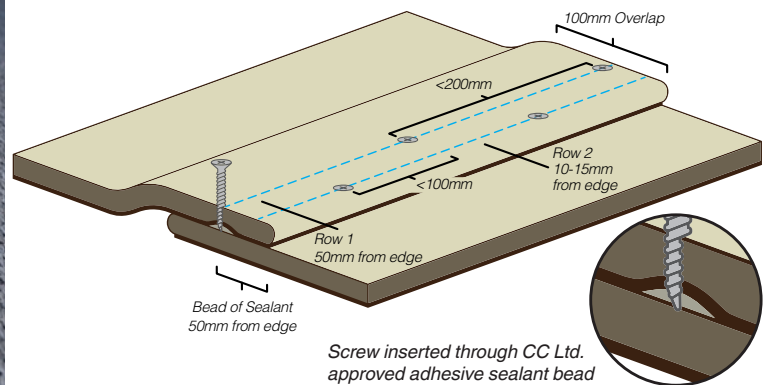
It is important to hydrate under the overlap prior to applying the adhesive sealant in order to remove excess dust, ensuring adhesive sealant contact with the fibrous top surface of the bottom CC layer and to provide moisture for curing. Surfaces should be damp during caulking but have no standing water.

Screws should be applied by staggering to create a 'zigzag' pattern. The first row of screws should be at 50mm from the edge of the top CC layer (through the sealant bead) and the second row of should be 10-15mm from the edge. The maximum screw spacing on each row should be 200mm, so that the maximum staggered screw spacing along the CC edge is 100mm. The screws should be applied immediately after hydration under the overlap but prior to setting, so the concrete within CC will then set around the thread of the screws. For this reason, it is important that the screws have a fully threaded shank.

For weed suppression of invasive species, please contact Concrete Canvas Ltd for specific jointing advice.



Adhesive sealant applied to under-lapped CC layer using caulking gun



Screw inserted through CC Ltd. approved adhesive sealant bead

Sealed and screwed zigzag joint

2.6 Upstands and Penetrations

CC can be cut to fit around existing upstands (such as fence posts) using tools such as a snap off blade knife, saw or disc cutter.

It is important to ensure that there are no gaps around upstands which may enable weed growth to establish. Any cuts or gaps should be covered with an additional CC layer, or filled with a suitable UV stable adhesive sealant or grout.

When working around large upstands such as concrete plinths, CC can be secured using mechanical fixings and adhesive sealants.

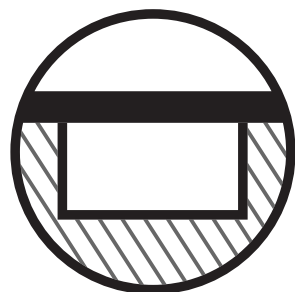
Set CC can be cut using conventional concrete cutting tools to create openings for new upstands.



CC cut to fit around existing upstands

3.0 Four Key Installation Principles of CC

The unique material properties of Concrete Canvas (CC) mean that it can be used for a variety of applications. Following the Four Installation Principles below will help ensure a successful installation.



Avoid Voids

1. Avoid Voids

Prepare the substrate so it is well compacted, geotechnically stable and has a smooth and uniform surface.

- For soil substrates, remove any vegetation, sharp or protruding rocks and fill any large void spaces. Ensure the CC makes direct contact with the substrate to minimise soil bridging or potential soil migration under the layer.
- For concrete substrates, remove any loose or friable material, cut away any protruding exposed re-bar and fill any large cracks or voids.

2. Secure Canvas

It is important to ensure that the CC is **Jointed** at every overlap between layers and that those layers are **Fixed** to the substrate.



Secure Canvas

- **Jointing:** Overlapped CC layers should be securely jointed together, typically this is achieved using stainless steel screws applied with an auto-fed screw gun at regular intervals. Correct screw placement will help ensure intimate contact between CC layers, prevent washout of the substrate, and limit potential weed growth. An adhesive sealant can be applied between the layers to improve the joint impermeability.

A non-penetrative method of jointing is to 'thermally bond' the CC layers together. This also improves joint impermeability. For more jointing options see the [CC User Guide: Jointing and Fixing](#).

- **Fixing:** When fixing to a soil substrate, ground pegs (eg J-pegs) are typically used. On rock or concrete substrates, CC layers can be jointed together and fixed to the substrate using masonry bolts or concrete screw anchors. Stainless steel fixings with washers are recommended.

3. Prevent Ingress

It is important to prevent water or wind ingress between the CC and the substrate, both around the perimeter of the installation and along the joints.

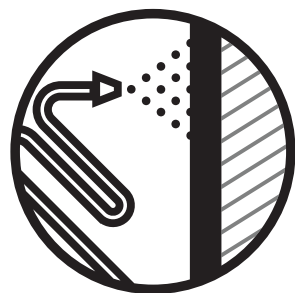


Prevent Ingress

- For soil substrates, this is typically achieved by capturing the entire perimeter edge of the CC within an anchor trench.
- On rocky or concrete substrates, the perimeter edge should be sealed with a concrete fillet or an adhesive sealant.
- All overlapped CC layers should be lapped in the direction of water flow.

4. Hydrate Fully

It is critical to properly hydrate CC, taking into account the quantity of material used and ambient temperature conditions.



Fully Hydrate

- Always ensure hydration through the fibrous top surface.
- Ensure to hydrate any overlapped areas and anchor trenched material prior to backfilling.
- Spray the fibre surface with water until it feels wet to touch for several minutes after hydration (the 'Thumb Test').
- Follow the [CC User Guide: Hydration](#).

4.0 Installation Methodology

4.1 Equipment Required

- Sufficient CC to complete project (total coverage area including overlaps and anchor trench material).
- Safety mask and gloves.
- Cutting equipment, snap off knife or disc cutter.
- Metal or plastic fixing pins
- Lump hammer
- Screwdriver and stainless screws or alternative method to join the CC layers
- Water supply.



Equipment required

See [CC Equipment List](#) for full details. Dust hazard. Wear appropriate PPE. Consult [CC SDS](#) document.

4.2 Substrate Preparation

- Remove vegetation and grade coverage area to a desired level and smoothness. CC will conform closely to the substrate. Measures such as introducing a shallow fall or perimeter drainage channels should be considered to prevent pooling areas which will inhibit leak detection in pipeline applications.
- Remove sharp or protruding rocks >25mm and fill any large voids.
- Herbicidal treatment of the coverage area is beneficial but not required where protecting against non-invasive species. CC has excellent chemical resistance and will not be adversely affected by the majority of commercially available herbicide treatments.
- In all installations, the perimeter edge of the CC layers should be captured within anchor trenching to prevent surface run-off ingress, wind uplift (particularly along railway track or roads), adjacent horizontal root growth and to provide a neat termination.
- For longitudinal deployment, perimeter anchor benches should be excavated (min. 100mm) at a 45 degree angle and secured in place.
- For transverse deployment standard 150x150mm anchor trenches should be excavated.
- For invasive species installations, the depth of the anchor trenching should be as per local government guidance and will typically be greater than standard trench depths.



Remove vegetation and grade substrate prior to installation



Prepare anchor trenches around perimeter edge for CC termination



Anchor trenches should be a minimum of 100mm

4.0 Installation Methodology continued...

4.3 Deployment

- Remove packaging and unroll CC across the coverage area to suit specified layup, ensuring the fibrous top surface faces upwards, with the PVC membrane in contact with the substrate.
- Unroll the material at a controlled speed and avoid unnecessary dragging.
- Where access is restricted by pipelines, low profile deployment frames can be winched under the infrastructure to reduce manual handling requirements.
- It is important to relax the material to relieve any tension generated in deployment. This can be achieved by lifting the CC layer by hand and repositioning. The installer must adjust the material to remove any wrinkles and ensure the CC conforms to the substrate when hand positioning.
- Cut the CC to the required length using a snap off knife or disc cutter. If cutting the material with a disc cutter, it is recommended to wet the cut beforehand to minimise dust generation.



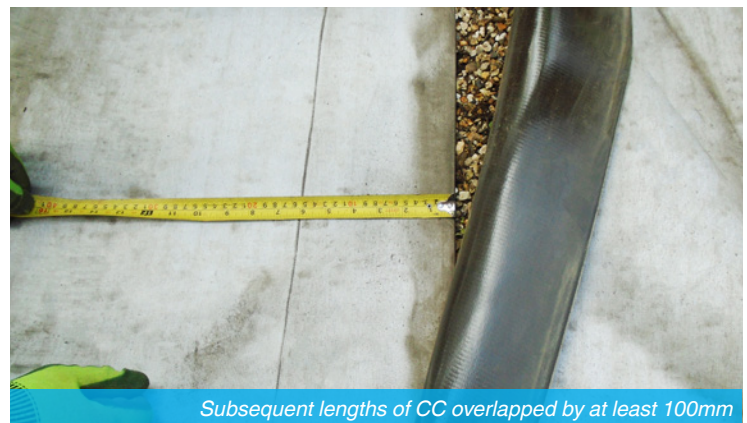
CC deployed from spreader beam



CC cut to required length

4.4 Jointing

- Adjacent layers of CC should be overlapped by a minimum of 100mm. If there is a fall on the substrate, the layers should be overlapped in the direction of run-off.
- Hydrate the material under the overlapped sections of the CC prior to jointing. Once hydrated, the material remains workable for 1 to 2 hours.
- Apply an 8mm diameter bead of CC approved adhesive sealant 50mm from the edge of the under-lapped layer.
- Fold back the overlap and secure by applying stainless screws in a 'zigzag' pattern, with one row of screws 50mm from the edge of the CC (through the sealant bead) and the other 10-15mm from the overlapped edge. Screws in each row should be at 200mm centres, staggered along each row so the maximum screw spacing along the edge is 100mm.
- Extra care should be taken to the location, frequency and spacings of the fixings to prevent rucking and to provide intimate contact between overlapped layers, ensuring accumulation of wind blown debris at joints is minimised.



Subsequent lengths of CC overlapped by at least 100mm



CC can be easily and safely installed around existing infrastructure

Note: A 'zigzag' screwed and sealed joint creates a physical barrier to sunlight, water and horizontal weed growth as well as ensuring intimate contact between layers. A screwed only joint will mitigate weed growth, not eliminate it entirely.

4.0 Installation Methodology continued...

4.5 Fixing

- It is essential that all exposed edges of the CC weed suppression layers are securely fixed to the substrate and/or surrounding infrastructure (concrete plinths, pipe upstands etc) to avoid wind uplift.
- Fixing to the substrate is typically achieved using appropriate pegs to suit the substrate and any penetration depth limitations. In granular or compacted substrates, 12-16mm diameter galvanised steel ground pegs with a sharpened point should be used. In clay/soil substrates, pegs or high load ground anchoring fixings (for example, Grippe TL-PI) can be used.
- Pegs should be installed through the overlap joints for transverse layups, or at 2m intervals layups for longitudinal layups. All perimeter edges must be buried.
- Stainless steel masonry fixings are typically specified for mechanically securing CC layers to adjacent concrete/steel structures such as pipe support, upstands, concrete plinths or fence posts.
- Only deploy what can be fully installed and hydrated before the end of construction day to minimise any adverse effect on the installation and/or performance capabilities of the product.
- If installation continues the following working day, protect the edge of the last layer of CC overnight with waterproof sheeting to enable jointing on return to work.
- Ensure the leading edge of the last layer of CC is suitably terminated into existing infrastructure or tucked into a termination trench to prevent water ingress beneath the CC.

4.6 Hydration

- After fixing and jointing, spray the CC with water to hydrate.
- It is not recommended to rely on rainfall to provide hydration. The material must be actively hydrated.
- Spray the fibre surface multiple times until the CC is fully saturated. The wet CC will first darken and then become lighter as it absorbs the water.
- Do not spray high pressure water directly onto the CC as this may wash a channel in the material.
- CC can be hydrated using fresh water or salt water and will hydrate and set underwater.
- It is not possible to over hydrate CC.
- A minimum volume of water equal to 50% of the material weight is required. For example, CC8 requires a minimum of 6 litres of water per square meter.



Fix CC to substrate using ground pegs and lump hammer



Fix CC to concrete infrastructure using stainless steel masonry fixings



CC fixed to substrate and existing infrastructure



CC fixed within termination trench which is backfilled to prevent undermining

4.0 Installation Methodology continued...

4.6 Hydration continued...

- To check proper hydration, the CC should feel wet to the touch several minutes after hydration.
- To determine whether the CC has been sufficiently hydrated, allow several minutes to pass after hydration and then press your thumb into the material. If it has been sufficiently hydrated, water will be forced to the surface of the CC and will be clearly visible. If no water is observed, then more water must be applied.
- For more information on hydration and for extreme temperature installations, please consult the [CC User Guide: Hydration](#).

4.7 Setting

- There is a working time of 1-2 hours after hydration.
- Backfill anchor trenches to create a neat termination and encourage surface water runoff to flow over the anchor trench and into the CC channel.
- CC hardens in 24 hours and is then ready for use.

4.8 Post Installation treatment

- If the weed suppressed area is intended for pedestrian trafficking, then it is advised to apply a textured coating to provide an anti-slip high friction surface and prevent non-root organic growth on the top fibrous surface of the CC.
- Unsealed joint installations may require light annual maintenance to remove any airborne debris at overlapped points of the installation. This material can be typically removed manually using a stiff brush, shovel or pressure washer.

4.9 Maintenance and Repair

- CC lined structures require minimal maintenance, providing long term effective weed suppression.
- If damage is found during a periodic inspection, a patch can be placed over the damaged area extending a minimum of 150mm in all directions beyond the damaged area, attaching with stainless steel screws and protecting cut edges with mortar or a CC approved adhesive sealant.



Hydration



Hydration touch test



Backfill anchor trench



Secure all perimeter edges