



 **CONCRETE CANVAS®**  
Concrete on a Roll

FREQUENTLY ASKED  
QUESTIONS

 The Queen's Awards for Enterprise: International Trade 2019	 Board of Trade Winner 2018	 Winner GROUND ENGINEERING AWARDS 2017 Technical Innovation Award	 ice   award winner Innovation Award ICE Wales Cymru Awards 2017	 BBA APPROVAL INSPECTION TESTING CERTIFICATION CERTIFICATE 19/0665 British Board of Agrément Certified	 ACS REGISTRARS QUALITY ASSURANCE ISO 9001 UKAS ACCREDITED ACS Registrars Ltd ISO 9001 Accreditation	 CPD CERTIFIED The CPD Certification Service Certified CPD Provider	 IGS Corporate Member	 EXPORTING IS GREAT BRITAIN & NORTHERN IRELAND Proud Supporter of Exporting is Great
--	---	---	---	---	--	--	---	---

 RAIL	 ROAD	 MINING	 PETROCHEM	 AGRO	 PUBLIC WORKS	 UTILITIES	 DEFENCE	 DESIGN	 SHELTER
--	---	---	--	---	---	---	--	---	--

## About Concrete Canvas® GCCM

### What is Concrete Canvas® GCCM?

Concrete Canvas® is part of a revolutionary new class of construction materials called Geosynthetic Cementitious Composite Mats (GCCMs). It is a flexible, concrete impregnated fabric that hardens on hydration to form a thin, durable, water proof and fire resistant concrete layer. Essentially, it's concrete on a roll.

### What applications is it currently used for?

Concrete Canvas® GCCM (CC) is typically used to replace conventional concrete for a wide range of erosion control and protection applications. Typical examples include channel lining, slope protection, bund lining, remediation works, culvert lining, outfall protection, mining vent walls, gabion covering and pipe protection. Our biggest markets are the Civil Infrastructure sector (principally road and rail), the Mining sector, the Petrochemical sector and the Agricultural sector.

### In what formats is CC available?

CC can be supplied as either palletised bulk rolls, or man portable batched rolls. CC5™ bulk rolls are 200sqm, CC8™ are 125sqm and CC13™ are 80m<sup>2</sup>. CC5™ batched rolls are 10sqm and CC8™ are 5sqm. Due to its relative weight, CC13™ is not available in batched rolls as standard.

### What are the weights of the different thicknesses of CC?

Concrete Canvas® GCCM has nominal dry weights of 7kg/m<sup>2</sup>, 12kg/m<sup>2</sup> and 19kg/m<sup>2</sup> for CC5™, CC8™ and CC13™ respectively.

### How is CC manufactured?

CC is manufactured in our UK production plant using bespoke machinery designed by Concrete Canvas® Ltd, to impregnate a custom cement blend into a 3 dimensional synthetic fibre matrix, with a PVC coating on one surface.

### Which countries is CC currently used in?

CC is currently used in over 80 countries around the world and exports make up over 80% of turnover. Outside of the UK our biggest markets are Brazil, Chile, Russia, Australia, Indonesia and the Middle East.

### Which contractors have installed CC?

Contractors include BAM Nuttall, Costain Group, Balfour Beatty, Morgan Sindall, Trant, Kier, Morrison Construction, Skanska, AMCO, Murphy Group, Dyer & Butler, Amey Colas, J Breheny Contractors Ltd and Knights Brown Ltd among many others.

### Which customers have previously specified CC for construction projects?

Customers include Network Rail, Highways England, The Environment Agency, Vale, and many more. We have also supplied 7 of the top 10 oil and gas companies in the world.

## Technical Information

### What fire protection does CC provide?

CC has achieved Euroclass classification B-s1, d0 and has passed the American MSHA (Mine Safety and Health

Administration) fire testing for use in underground mining applications.

### What level of chemical resistance does CC provide?

CC has excellent resistance to chemical attack, in particular sulphate attack, which means it is well suited for use in ground surfacing applications. The concrete we use is also much more resistant to chemical attack compared to ordinary Portland concrete. CC has passed acid (ph1), alkaline (ph13) and hydrocarbon immersion tests to BS14414.

### Can CC be used for Slope Protection and Stabilisation?

CC is increasingly being used for slope protection, as an alternative to shotcrete to protect slopes from surface erosion caused by weathering, surface run-off and environmental degradation. In certain applications CC can be used for structural slope stabilisation by combining it with steel mesh and soils nails (see the [CC Installation Guide: Slope Protection](#) for more details). In this case the project should be designed by a geotechnical engineer.

### What is the difference between Slope Protection and Slope Stabilisation?

Slope protection is where the body of the slope is inherently stable but the surface of the slope is prone to erosion from weathering and surface slip. Typically this might be on a sandstone rock face, or on slopes constructed from a mixture of small rocks and fine sand where rainfall causes loss of fines which then destabilises the slope causing rock-falls.

Slope stabilisation is where the body of the slope is inherently unstable and is at risk of suffering from deep slip (where a large mass of the slope collapses). This may be caused by ground-water lubricating the soil or from other factors such as ground vibration. Conventional solutions include shotcrete, steel mesh and soil nails which are used to stabilise the slope by providing structural reinforcement. When combined with a steel mesh facing system, CC can substitute for the shotcrete component of this design for many projects but must be included as part of a solution designed by a qualified geotechnical engineer.

### How waterproof is CC?

The level of waterproofing that materials provide is typically referred to in geotechnics using a measure of impermeability called the k-value. CC has been tested to BS1377 and has an average k value of between 10<sup>-8</sup> and 10<sup>-9</sup> m/s, which is similar to clay; a range commonly referred to as being impervious.

If the overall impermeability level is critical for your application then you will need to carefully consider the CC jointing method you use. Please see the [CC User Guide: Jointing and Fixing](#) document for more information.

### Can CC be used for Trackway?

We do not recommend CC as a vehicle trackway in most circumstances. However CC can be used as hard armour capping of ground to prevent dust generation, erosion and wash-out of fines. The load bearing capacity of the trackway should be based on the surface modulus (CBR) of the ground which should be sufficient to support the requisite traffic loading.



The CC should therefore only be used to provide surface erosion control rather than to increase the surface modulus of any given substrate. For this type of application we would typically recommend 2 layers of CC13™ with an offset overlap and the 2 layers screwed together.

### Installation and Use

#### How should CC be stored prior to use?

CC should be stored under cover in dry conditions, away from direct sunlight and within the manufacturers sealed packaging.

#### What is the shelf life of properly stored CC?

When stored in the manufacturers packaging in the correct conditions, CC can be kept for up to 24 months without significant degradation in performance. After the 24 month point CC will continue to function but it may take longer to reach the values specified on the CC data sheet.

#### What is the shelf life after opening CC?

CC will start to lose performance once opened and should be used within a few days to prevent any significant degradation. It is best practise to reseal any packaging after opening to extend this period as much as possible.

#### Is it possible to lay CC in wet conditions?

Yes. Once wet, CC has a working time of approximately 1-2 hours in a UK climate.

#### Is it possible to lay CC in very cold conditions?

Yes. Warm water should be used for hydration and plastic sheeting should be applied over hydrated material during setting. Consult the [CC & CCH Hydration Guide](#) for further instruction or contact Concrete Canvas® Ltd directly. Generally, the same setting conditions that apply to conventional concrete pouring should be observed when installing CC.

#### Are there any special precautions to take when laying CC in very hot conditions?

Yes. It is advised to hydrate CC at dusk to avoid the hydration water evaporating in warm environments. In very hot conditions, it is advised to re-wet the material at 2 hour intervals for the first 8 hours.

#### What is the lifespan of properly installed CC?

CC has a design life of over 50 years in conditions similar to a UK climate. For advice on specific climates please contact Concrete Canvas® Ltd.

#### Does CC require any post-installation maintenance?

Providing it is installed correctly, CC requires no regular post-installation maintenance.

#### How should CC be disposed of or demolished?

CC can be demolished using standard construction demolition equipment and disposed of in the same manner as conventional concrete waste.

#### Is it possible to accelerate or retard CC's setting time?

Yes. In sufficient order volumes, Concrete Canvas® Ltd can accelerate or retard the setting times of CC to accommodate

different environmental conditions and applications.

#### Is it possible to over-hydrate CC?

One of the key features of CC is that the fixed internal volume and control during manufacture ensures void space is set within carefully prescribed bounds and subsequently limits the Water:Cement ratio achieved in the field. It is therefore not possible to over hydrate CC and can therefore be installed in adverse weather conditions.

#### What happens if CC is under hydrated?

The CC will not reach its full strength and the setting time may be delayed.

#### Will CC set underwater?

Yes. It will hydrate fully from immersion.

#### Which thickness of CC should I specify?

It depends on the application. Consult the application table in the [CC User Guide: General](#) or contact Concrete Canvas® Ltd directly for technical advice.

#### What methods are there of joining layers of CC together?

The 3 most common methods are: a screwed overlap joint, a screwed and sealed overlap joint or a thermally bonded overlap joint. There are a number of other mechanical and non mechanical methods which may be suitable for particular applications, Please see the [CC User Guide: Jointing & Fixing](#) or contact CC for more details.

#### What water should be used to hydrate CC?

CC can be hydrated using saline or non saline water. The water does not need to be potable.

#### How much water per m<sup>2</sup> of CC should be used for hydration?

The minimum ratio of water:CC is 1:2 by weight. For Example, CC8 weighs 12kg/m<sup>2</sup> and a minimum of 6 litres per m<sup>2</sup> is required for hydration. CC cannot be over hydrated so an excess of water is always recommended.

#### Is there a maximum inclination that CC can be installed onto?

CC can be installed onto vertical surfaces.

#### At what intervals should CC be pegged down?

This is dependent on the application and the quality/inclination of the substrate; as a guide we recommend pegging at 2m intervals and at joints.

#### Should CC be laid fibre or PVC surface facing upwards?

CC should be installed with the fibre surface exposed. The fibre reinforced concrete layer will protect the PVC backing from weathering and UV damage.

#### Can CC be used without the PVC?

The PVC is an important part of how CC functions, both in terms of maintaining its waterproof properties and preventing water loss during hydration. We do not supply CC without the PVC backing.

## How can I cut CC?

Prior to hydrating, unset CC can be cut using basic hand tools. It is recommended to use snap off disposable blades or handheld self sharpening powered disc cutters. After CC has set, it can be cut using angle grinders, jigsaws with ceramic blades or good quality tile cutters.

## What Health and Safety precautions should I take when handling CC?

General PPE precautions should be taken; face masks, protective clothing and gloves should be worn when handling CC. CC does not contain measurable amounts of soluble chromium (VI) and is not classified as an irritant. Consult the CC & CCH (M)SDS document for more information.

## How does CC compare environmentally with conventional poured concrete ditch lining?

CC typically replaces 100-150mm of poured, sprayed or precast concrete, resulting in typical material savings of 95%. This directly results in a reduction on the carbon footprint of construction works. A recent Life Cycle Assessment found that CC8 contains 45% of the embodied carbon compared to a 150mm ST4 poured concrete channel, before the carbon savings are also considered

## Has CC been granted EA (Environment Agency) approval for projects within the UK before?

Yes. CC has been approved for use by the Environment Agency (EA) SEPA and Natural Resources Wales on several projects since 2009 and case studies are on our website. Project approval is granted on a case-by-case basis.

## How does CC washout affect the alkalinity of running water courses during installation?

CC has a low wash out rate and limited alkaline reserve. Unlike most concretes it is not classed as an irritant.

## Availability

### Are there different colours of CC available?

CC is stocked and supplied in its natural colour (mottled grey) as standard. There are a number of options for colouring CC including dyeing the surface fabric fibres or applying coloured surface treatments, such as painting the fibre surface of CC with a good quality exterior masonry paint.

### Are there different widths of CC available?

CC is supplied in standard widths of 1.0m for CC5™ and 1.1m for CC8™ and CC13™. Wide Rolls up to 4m (CC5™) and 4.4m (CC8™) can be manufactured to order. It is possible to produce narrower rolls but this would be subject to a minimum order quantity.

### Can I order different lengths of material other than the standard bulk or batched lengths?

Yes, bespoke lengths can be supplied subject to a batching surcharge.

### Where can I buy ancillary CC installation products?

Concrete Canvas® Ltd can supply a full range of ancillary products for CC installation including ground pegs and sealant.

## Does Concrete Canvas® Ltd have international distributors for CC?

Yes. See the Contact Us page on our website for details about who to contact to find your nearest distributor.

## Are samples of CC available?

Yes. Concrete Canvas® Ltd supplies small and large sample packs which contain hardened swatches and unset A4 samples of each of the three material thicknesses. Due to the volume of requests for sample packs, a postage fee will apply.

## What is the price of CC?

The price of CC is volume dependant and the price/m<sup>2</sup> drops when ordering large volumes. Contact your local Concrete Canvas® Ltd rep for a quote specific to your requirements and delivery location.

