



# CONCRETE CANVAS®

Concrete on a Roll

## EMBODIED CARBON REPORT

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

-   
Winner  
Technical Innovation Award
-   
Innovation Award  
ICE Wales Cymru Awards 2017
-   
2014 Fast Track 100  
16th fastest growing company in the UK.
-   
2014 Queen's Award  
for Enterprise in Innovation
-   
2013  
Macrobert Award  
Finalist
-   
2013 Innovation Award Winner  
Ralltex Exhibition
-   
2012 R&D 100  
Award winner  
R&D Magazine
-   
2009 Winner  
Material ConneXion Medium Award  
Material of the Year
-   
D&AD Yellow Pencil Award  
Winner  
Product Design



## Executive Summary

Concrete Canvas® (CC) is a carbon efficient, sustainable material that offers significant embodied carbon reduction compared to traditional concrete methods. The material has undergone a full Life Cycle Assessment as per ISO 14040 resulting in an Environmental Product Declaration as per EN 15804.

When considering raw materials alone, a **Concrete Canvas® lined channel will contain only 45% of the Embodied Carbon of a conventional concrete channel. A saving of 55%.**

Assuming that CC will be transported five times further to site than a locally sourced concrete supply, **CC offers more than 50% reduction in transportation carbon costs.** CC is typically installed at ten times the rate of poured concrete so significant carbon savings are expected when considering Construction Installation Process carbon costs but will vary from project to project.



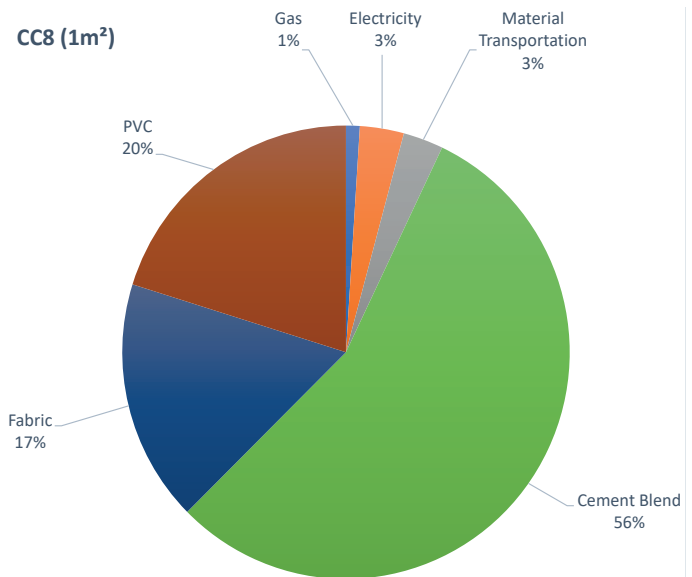
*CC being used as an alternative to poured (in-situ) concrete for channel lining.*

## CC Carbon Research Report

Concrete Canvas Ltd have carried out a Life Cycle Assessment to ISO 14040 and prepared an Environmental Product Declaration as per EN 15804.

Life Cycle Analysis (LCA) for a square metre of each grade of CC and CC Hydro has been determined for product stage modules 'A1 to A3' – raw material supply, transport of raw materials and manufacturing associated processes.

The average values of the environmental impacts for the production of CC have been calculated on the basis of 2016 annual production volumes.



## CC Carbon Research Results

Parameter	Unit	LCA - ENVIRONMENTAL IMPACT RESULTS		
		1 Square Meter of CC5	1 Square Meter of CC8	1 Square Meter of CC13
Global warming potential (GWP)	Kg CO2-Eq.	9.59	16.13	24.08

In order to determine the relevance of this data, consider replacing a typical 150mm ST4 poured concrete channel with CC8. The C20 concrete Embodied Carbon data is taken from the ICE database for construction materials:

ST4 (C20/24Mpa)	Kg CO2-Eq.	Concrete Density kg/m³	Weight of 150mm x 1m²	Kg CO2-Eq. /m²
Total	0.100	2400	360	36.00

1sqm CC8 contains 16.13kg CO2/m². Therefore when considering raw materials alone, a Concrete Canvas® channel will contain 45% of the Embodied Carbon of a conventional concrete channel. A saving of 55%.

This excludes carbon costs for the Construction Process Stage. Firstly, Transport. Assuming CC travels 100 miles and concrete only 20 miles to a construction site:

Transport to Site Comparison	Tonnes	Miles	Kg CO2-Eq./Tonne/Mile Delivery	Tonne/Mile CO2-Eq.	Kg CO2-Eq. /m²
Concrete Full Load	17	20	0.161	54.74	0.44
Pallet of CC	1.6	100	0.161	25.76	0.21

- Based on this example, Concrete Canvas® provides a 50% saving in transport carbon costs.
- Construction Installation Process carbon costs also need to be considered. Concrete Canvas® is typically 10 times faster to install than poured concrete so significant carbon savings are expected, but have not been included in this research due to the variable nature of installation processes.

## Environmental Product Declaration

This Environmental Product Declaration (EPD) is in accordance with the requirements of EN 15804 and provides additional information compliant with transparency requirements of this standard, regarding products and services.

### 1. Calculation rules for Life Cycle Analysis (LCA)

#### 1.0 Declared Unit

1 Square meter of Concrete Canvas®

#### 1.1 Product Description

This EPD covers the production of Concrete Canvas® in the Concrete Canvas Ltd production plant.

Concrete Canvas® (CC) 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.

#### 1.2 Reference Service Life (RSL)

Since this EPD is based on a cradle-to-gate analysis, the RSL concept is not specified.

#### 1.3 System Boundaries

This EPD covers the cradle-to-gate stages. Life cycle stages such as installation, use and maintenance, replacements, demolition, waste processing for re-use, recovery, recycling and disposal are excluded from the scope of this analysis.

The packaging step has been excluded from the scope of the analysis, since it produces less than 1% of the total environmental impact in production of Concrete Canvas®.

#### 1.3.1 Product Stage

Module “A1 – A3”: this step covers environmental impact of producing constituent raw materials, transport of raw materials to the factory gate and internal transport, manufacturing and associated processes to produce Concrete Canvas®, generation of electricity, heat from primary energy resources. Wasted material amount is accounted for and its environmental impact is apportioned to the declared unit for this report. Transportation of Concrete Canvas® from the plant to the end customer is not included.

#### 1.4 Criteria for the Exclusion of Inputs and Outputs

In compliance with EN 15804:

- Up to 99% (in mass) of all inputs are covered by the present environmental impact assessment. The whole energy consumption is included into the scope of this EPD.

#### 1.5 Selection of Data

Manufacturers’ average, and specific data sets have been used in estimating the impact of modules A1 (Raw Material Supply) and A2 (Raw Material Transport). The A3 (Manufacturing) data inputs were collected from the Concrete Canvas Ltd production plant.

The average values of the environmental impacts for the production of Concrete Canvas® have been calculated on the basis of the 2016 annual production volumes.

#### 1.3 System Boundaries

#### 1.6 Data Quality

Data sets used for calculations have been updated within the last 10 years for generic data and within the last 1 years for producer specific data. Data sets are based on 1 year averaged data.

### CEN standard EN 15804 serves as the core PCR\*

Independent verification of the declaration and data, according to EN ISO 14025:2010

Internal       External

\* Product Category Rules b Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4).



## 2. General Information

### 2.0 Manufacturer's Details

Concrete Canvas Ltd  
Unit 3, Block A22,  
Pontypridd,  
CF37 5SP  
United Kingdom

### 2.1 Product Use

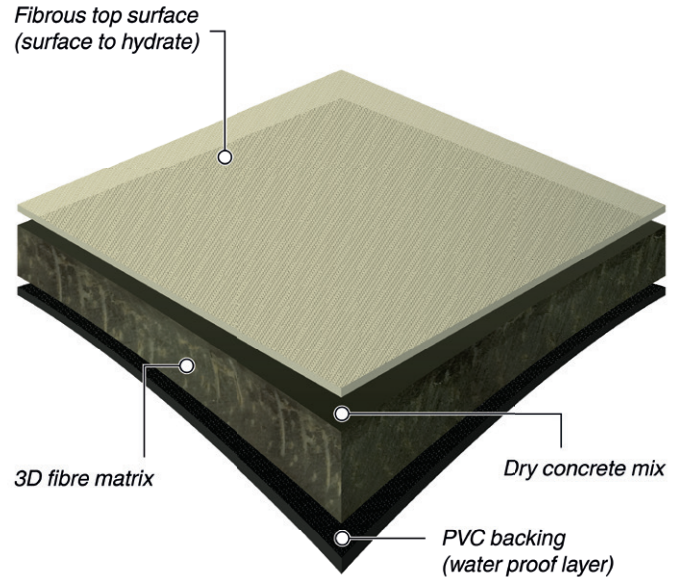
Concrete Canvas® (CC) has a wide variety of uses within multiple sectors including but not limited to channel lining, slope protection, lining of secondary containment bunds, concrete remediation, weed suppression, gabion reinforcement, pipe protection and culvert repair.

### 2.2 Installation Information

Guidance on safe and effective installation and use of the product can be found on the company website.

[www.concretcanvas.com/installation](http://www.concretcanvas.com/installation)

### 2.3 Concrete Canvas® GCCM section and main components



## 3. LCA Results

Description of the System Boundary																
Product Stage			Construction Process Stage		Use Stage							End of Life Stage			Beyond the System	
Raw Materials Supply	Transport	Manufacturing	Transport	Construction - Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Demolition, Deconstruction	Transport	Waste Processing	Disposal	Potential Recycling - Recovery - Reuse
A1	A2	A3	S4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Included in LCA*			Modules not included													

\* This product module "A1 –A3" covers raw materials supply, transport of raw materials, manufacturing and associated processes to produce Concrete Canvas®. These data can be used as a source for generating the Environmental Product Declaration of an installation where Concrete Canvas® can be considered as a raw material. In this case, these data correspond to the A1 module (raw materials extraction and processing, processing of secondary materials input).

### 3. LCA Results continued.

		LCA RESULTS - ENVIRONMENTAL IMPACT RESULTS		
Parameter	Unit	1 Square Meter of CC5	1 Square Meter of CC8	1 Square Meter of CC13
Global warming potential (GWP)	Kg CO2-Eq.	9.59	16.13	24.08

		LCA RESULTS - RESOURCE USE		
Parameter	Unit	1 Square Meter of CC5	1 Square Meter of CC8	1 Square Meter of CC13
Total use of renewable primary energy resources	MJ	1	1.7	2.8
Total use of nonrenewable primary energy resources*	MJ	1.6	2.8	4.6
Net use of fresh water	M3	0	0	0

\* Methodology: CML - natural gas (38.84 MJ/m3) 8006-14-2 m3 ~ 38,84 MJ

### 4. LCA Interpretation

#### 4.0 Climate Change (GWP)

Methodology: CML 3.9 - Greenhouse effect (direct, 100 years).

Greenhouse gases emitted over the life cycle are mainly CO2 gases. They are mostly associated with component raw materials (94%). Remaining 6% are associated with emissions due to raw material transportation and energy resources consumed in production of Concrete Canvas®.

#### 4.1 Natural Resource Use

Methodology: CML 3.9 - Depletion of abiotic resources (fossil and elements).

Over 99% of the depletion of natural resources is due to the consumption of fossil fuels. These are mostly related to the production of cement. Around 50% of the impacts attributed to cement come from process fuels consumption (mostly fuel oil and natural gas). Around 30% of the overall impact is related to resource consumption for the production and transformation of plastics.

#### Owner of the Declaration

Concrete Canvas Ltd  
Unit 3, Block A22,  
Pontypridd,  
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**Disclaimer: this declaration is for information purposes only.**

The information contained herein regarding our products' characteristics is accurate and correct to the best of our current knowledge, as of the date of this declaration. However, this environmental product declaration does not constitute a guarantee concerning the characteristics of the products, nor does it constitute a guarantee that the products will retain particular characteristics for a specified period. Guarantee, if any, about the products, can only result from specific written agreement from us. Moreover, the characteristics of our products as well as our industrial process may change which could impact the information contained herein. This information must in no event be used as a substitute for necessary prior tests to be completed by the users, which constitutes the sole means to ensure that our products are suitable for a given use.