

Statement of Verification

BREG EN EPD No.: 000365

Issue 02

This is to verify that the

Environmental Product Declaration

provided by:

Ibstock Telling GRC Ltd

is in accordance with the requirements of:

EN 15804:2012+A1:2013

and

BRE Global Scheme Document SD207

This declaration is for:

Brick Faced GRC Façade Panels



Company Address

Unit 4E Station Road
Four Ashes
Wolverhampton
WV10 7DB



Signed for BRE Global Ltd

Emma Baker
Operator

22 April 2022
Date of this Issue

08 July 2021
Date of First Issue

07 July 2026
Expiry Date



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To check the validity of this statement of verification please, visit www.greenbooklive.com/check or contact us.

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Environmental Product Declaration

EPD Number: 000365

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013
Commissioner of LCA study	LCA consultant/Tool
Ibstock Telling GRC Ltd Unit 4E Station Road Four Ashes Wolverhampton WV10 7DB	Andrew Dutfield/ BRE LINA v2.0
Declared Unit	Applicability/Coverage
1 square metre (m ²) of Brick-faced GRC panel maximum weight 110 kg/m ²	Product Average.
EPD Type	Background database
Cradle to Gate	Ecoinvent 3.2
Demonstration of Verification	
CEN standard EN 15804 serves as the core PCR ^a	
Independent verification of the declaration and data according to EN ISO 14025:2010 <input type="checkbox"/> Internal <input checked="" type="checkbox"/> External	
(Where appropriate ^b)Third party verifier: Pat Hermon	
a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)	
Comparability	
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A1:2013. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A1:2013 for further guidance	

Information modules covered

Product			Construction		Use stage							End-of-life				Benefits and loads beyond the system boundary
					Related to the building fabric					Related to the building						
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse, Recovery and/or Recycling potential
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: Ticks indicate the Information Modules declared.

Manufacturing site

Ibstock Telling GRC Ltd
Unit 4E Station Road
Four Ashes
Wolverhampton
WV10 7DB

Construction Product

Product Description

Brick Faced Glassfibre Reinforced Concrete (Brick Faced GRC) is a composite material comprising of, natural brick facings embedded in GRC material comprising of cement, fine aggregates, alkali resistant glass fibres, acrylic polymers and admixtures/additives.

Ibstock Telling GRC Ltd manufacture bespoke Brick faced GRC façade panels in accordance with the recommendations and guidelines stated within “Specification for the Manufacture, Curing and Testing of Glassfibre Reinforced Concrete (GRC) Products” published by The International Glassfibre Reinforced Concrete Association (GRCA) in addition to relevant British Standards.

Grade 18P mix design provides a spray grade material that achieves the highest technical performance of all the GRC grades. GRC is easily moulded, its high strength capabilities enable the design and off-site manufacture, of thin lightweight cladding elements to provide non-structural decorative brick facades to buildings in both new build and refurbishment sectors.

Technical Information

Property	Value, Unit
Maximum weight per m2	110 kg/m2
Thickness of brick layer - Typically	25 mm
Thickness of GRC layer - Typically	12 mm
Modulus of Rupture (flexural) (MOR28)	18-30 N/mm2
Limit of Proportionality (flexural) (LOP28)	5-10 N/mm2

Property	Value, Unit
Ultimate Tensile Strength (UTS28)	8-12 N/mm ²
Bend over point (tensile) (BOP28)	4-6 N/mm ²
Interlaminar Shear	2-4 N/mm ²
In-Plane Shear	7-12 N/mm ²
Punching Shear	25-35 N/mm ²
Charpy Impact Strength	15-25 N/mm ²
Dry Bulk Density	1800-2100 Kg/m ³
Water Absorption	8-13%
Apparent Porosity	16-25%
BS EN 13501-1:2007 + A1:2009 Fire classification of construction products and building elements. Classification using test data from reaction to fire tests.	Fire Classification A1

N.B. These figures refer to the GRC component only and not the entire brick-faced GRC panel. The additional performance attributes obtained from applying a brick face are variable relative to the performance attributes of the chosen brick.

Main Product Contents

Material/Chemical Input	Values
Aggregate/cement ratio	0.5-1.5
Water/cement ratio	0.30-0.38
Glassfibre content (% by weight of total mix)	4.0-5.5%
Polymer solids content (% by weight of cement)	Nil (Grade 18), 4-7% (Grade 18P)
Extreme dimensional variations (mm/m)	0.6-1.2
Water absorption	5-11%
Minimum bulk dry density (kg/m ³)	1800
Minimum bulk wet density (kg/m ³)	2000

N.B. Mix design is from GRCA Specification for the Manufacture, Curing & Testing of Glassfibre Reinforced Concrete (GRC) Products Guide Mix Designs for Grades 18/18P.

Manufacturing Process

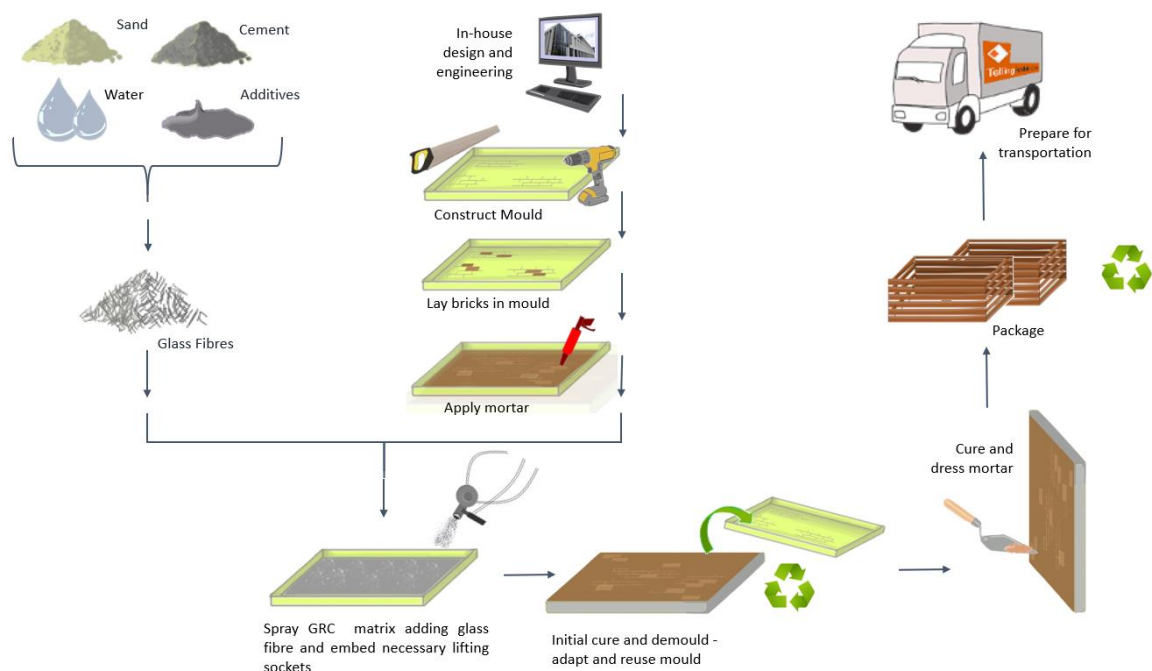
Brick facings are typically 25mm thick and where possible are cut from bricks that are faced both sides to optimise efficiencies and reduce waste material. The facings are laid faced down to specified bond pattern in the mould and pointed with Hydraulic Lime Mortar, a material known also for the added benefit of absorbing CO₂ whilst curing. Anchors are placed in position, typically 1 per brick, that will enable pull out values in excess of 2kN per anchor to be achieved.

GRC backing material is manufactured as follows to a typical thickness of 12 mm. The base materials – Cement, Sand (fine aggregate), Water, Admixtures and Additives are batched in accordance with the stated design mix to form the matrix. The backing mix comprises matrix material which is pumped through a concentric spray gun, where it meets with the correct proportion of chopped alkali-resistant glass fibre strands, enabling even distribution of fibres within the matrix. This GRC material is sprayed in 3 or 4 layers to the design thickness. Each layer is manually compacted to remove any trapped air before the addition of the next

layer. Following initial curing, the resultant panels are demoulded. The mould can be adapted and reused multiple times in the manufacturing process to produce similar sized or repeat pattern panels. Panels are inspected for any defects and the bricks are surface pointed as specified.

Panels are packed sequentially to optimise delivery and installation sequence. Customers are required to return timber crates/stillages to Ibstock Telling GRC to enable any necessary repair or adaption to enable continued reuse. Similarly all wrappings should be returned to enable waste management in accordance with the objectives detailed in their ISO 14001 Environmental Management System.

Process flow diagram



Construction Installation

Our manufacturing process enables an “on time/just in time” delivery strategy which provides efficiencies in the installation process such as:-
 Reduced time on site – premanufactured panels enable the façade to be removed from the critical path.
 Installation by the façade contractor without the need for a tower crane – can be installed by monorail or spider crane. It would be feasible for each crew to install 50-80m² of Brick Faced GRC panels on site per day. The panels are attached to the façade using aluminium and steel support bracketry appropriate to the under-construction/supporting structure. The method of fixing is very much dependant on the panel system type, panel size and design parameters of individual projects. The installation work is generally undertaken by a Specialist Façade Contractor.

Use Information

GRC Grade 18P is the highest performance grade GRC recognised for its high tensile strength and ability to withstand impacts without resulting fail. In use, it is assumed that no maintenance is required. Weathering and long term appearance is dictated by numerous factors such as, specified finish, colour, texture, building type, dimension, location, orientation, climate etc. Weathering is expected to be the same as traditional brickwork with no maintenance expected. The reference service life for the declared unit is 100 years.

End of Life

GRC elements are suitable for recycling in a similar way to concrete once any metallic parts of fixings are removed. Due to the high content of cement, crushed hardened GRC may still show residual capacity for hydration and contribute to the development of strength of concrete from such a recycled aggregate.

Life Cycle Assessment Calculation Rules

Declared unit description

1 square metre (m²) of Brick-faced GRC panel maximum weight 110 kg/m²

System boundary

This is a cradle-to-gate LCA, reporting all production life cycle stages of modules A1 to A3 in accordance with EN 15804:2012+A1:2013.

Data sources, quality and allocation

This EPD covers all Brick-faced GRC panel products manufactured by Ibstock Telling GRC and the 110 kg/m² maximum weight represents a worse case scenario to represent all of the products assessed.

Data collected by Ibstock Telling GRC for the production of the Brick-faced Glass Reinforced Concrete (GRC) panel at the Wolverhampton site for the period 1st September 2019 to 31st August 2020 has been used for this EPD. The difference between input and output materials resulted in a mass balance of 99% and so an uplift of input materials of 1% was needed. Ibstock Telling GRC manufacture other products in addition to Brick-faced GRC panels which form 33% of the total Ibstock Telling GRC production. Figures for the raw materials, ancillary materials and packaging were from actual usages. Energy figures are calculated from an energy supplier analysis and water figures are calculated from water industry figures for water usage per employee. Energy, water, non-production waste and wastewater have been allocated on a m² of production basis. Production waste was allocated from total site to the product on a mass of production basis. Allocation of energy, water, and waste has been done according to the provisions of the BRE PCR PN514 and EN 15804.

Secondary data has been drawn from the BRE LINA database v2.0.79 and the background LCI datasets are based on ecoinvent v3.2 (2015). The dataset for unspecified cement was used to represent white cement and all types of aggregate were represented by the generic crushed gravel dataset. Bricks were represented by a generic Brick Development Association (BDA) dataset.

Quality Level	Geographical representativeness	Technical representativeness	Time representativeness
Very Good	Data from area under study	Data from processes and products under study. Same state of technology applied as defined in goal and scope (i.e. identical technology)	n/a
Fair	n/a	n/a	Less than 10 years of difference between the reference year according to the documentation, and the time period for which data are representative

The quality level of geographical and technical representativeness is Very Good. The quality level of time representativeness is Fair as the background LCI datasets are based on ecoinvent v3.2 which was compiled in 2015 and so there is less than 10 years between the reference year according to the documentation, and the time period for which data are representative.

Cut-off criteria

All raw materials and energy input to the manufacturing process have been included, except for direct emissions to air, water and soil, which are not measured. The inventory process in this LCA includes all data related to raw material, packaging material and consumable items, and the associated transport to the manufacturing site. Process energy and water use and direct production waste are included.

LCA Results

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts			GWP	ODP	AP	EP	POCP	ADPE	ADPF
			kg CO ₂ equiv.	kg CFC 11 equiv.	kg SO ₂ equiv.	kg (PO ₄) ³⁻ equiv.	kg C ₂ H ₄ equiv.	kg Sb equiv.	MJ, net calorific value.
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	5.52E+01	8.64E-06	7.78E-01	1.50E-01	7.42E-02	6.92E-04	1.63E+03

GWP = Global Warming Potential;
 ODP = Ozone Depletion Potential;
 AP = Acidification Potential for Soil and Water;
 EP = Eutrophication Potential;

POCP = Formation potential of tropospheric Ozone;
 ADPE = Abiotic Depletion Potential – Elements;
 ADPF = Abiotic Depletion Potential – Fossil Fuels;

Parameters describing resource use, primary energy			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	5.60E+02	1.44E-03	5.60E+02	1.76E+03	9.17E+01	1.85E+03

PERE = Use of renewable primary energy excluding renewable primary energy used as raw materials;
 PERM = Use of renewable primary energy resources used as raw materials;
 PERT = Total use of renewable primary energy resources;

PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials;
 PENRM = Use of non-renewable primary energy resources used as raw materials;
 PENRT = Total use of non-renewable primary energy resource

Parameters describing resource use, secondary materials and fuels, use of water			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m ³
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	0.00E+00	0.00E+00	0.00E+00	1.73E+00

SM = Use of secondary material;
 RSF = Use of renewable secondary fuels;

NRSF = Use of non-renewable secondary fuels;
 FW = Net use of fresh water

LCA Results (continued)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG
	Total (of product stage)	A1-3	4.82E+00	1.67E+01	5.81E-03

HWD = Hazardous waste disposed;
 NHWD = Non-hazardous waste disposed;
 RWD = Radioactive waste disposed

Other environmental information describing output flows – at end of life						
			CRU	MFR	MER	EE
			kg	kg	kg	MJ per energy carrier
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	2.94E+00	7.78E+01	0.00E+00	0.00E+00

CRU = Components for reuse;
 MFR = Materials for recycling

MER = Materials for energy recovery;
 EE = Exported Energy

Additional information

The environmental performance of this EPD should not be used in isolation when comparing façade systems. It should be recognised that further environmental benefits pertinent to the groundworks and design of the structural frame can be expected when considering lightweight concrete façade solutions.

References

BSI. Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products. BS EN 15804:2012+A1:2013. London, BSI, 2013.

BSI. Environmental labels and declarations – Type III Environmental declarations – Principles and procedures. BS EN ISO 14025:2010 (exactly identical to ISO 14025:2006). London, BSI, 2010.

BSI. Environmental management – Life cycle assessment – Principles and framework. BS EN ISO 14040:2006. London, BSI, 2006.

BSI. Environmental management – Life cycle assessment – requirements and guidelines. BS EN ISO 14044:2006. London, BSI, 2006.

Specification for the Manufacture, Curing & Testing of Glassfibre Reinforced Concrete (GRC) Products, The International Glassfibre Reinforced Concrete Association (GRCA), Northampton, UK, latest edition available at <https://www.telling.co.uk/gfrc/>.