



# ENVIRONMENTAL PRODUCT DECLARATION

*In accordance with EN 15804 and ISO 14025*

15mm

**Glasroc F FIRECASE**

Date of issue : May 2014

Valid until : May 2019



The **environmental impacts** of this product have been assessed over its **whole life cycle**. Its Environmental Product Declaration has been verified by an **independent third party**.

**DECLARATION NUMBER**

**S-P-00471**



# 1. General information

**Manufacturer:** BPB United Kingdom Limited trading as British Gypsum

**Programme used:** The International EPD® System. For more information see [www.environdec.com](http://www.environdec.com)

**EPD registration number/declaration number:** S-P-00471

**PCR identification:** EN 15804 as the core PCR + InstitutBauen und Umwelt e.V. PCR Guidance-Texts for Building-Related Products and Services, Part B: Requirements on the EPD for Plasterboard version 1.5. And with reference to The International EPD® System PCR 2012:01 version 1.2 for Construction Products and CPC 54 construction services.

**Product / product family name and manufacturer represented:** 15mm Glasroc F FIRECASE

**Declaration issued:** May 2014, **valid until:** May 2019

**Owner of the declaration:** BPB United Kingdom Limited trading as British Gypsum, Saint-Gobain House, Binley Business Park, Coventry. CV3 2TT

**EPD Prepared by:** Rachel Morris, LCA Analyst, British Gypsum

**Scope:** The LCA is based on 2012 production data for one site in the United Kingdom for 15 mm Glasroc F FIRECASE for use in Great Britain. The production site is Sherburn-in-Elmet, North Yorkshire. This EPD covers information modules A1 to C4 (cradle to grave) as defined in EN 15804:2012.

The declared unit is 1m<sup>2</sup> of 15mm thick Glasroc F FIRECASE. The assumed density is 904 kg/m<sup>3</sup> (13.56 kg/m<sup>2</sup>) of 15mm FIRECASE.

EPD of construction products may not be comparable if they do not comply with EN15804.



CEN standard EN 15804 serves as the core PCR<sup>a</sup>

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

Internal

External

Third party verifier<sup>b</sup>:

Dr Andrew Norton, Renuables

<sup>a</sup> Product Category Rules

<sup>b</sup> Optional for business-to-business communication; mandatory for business to consumer communication (see EN ISO 14025:2010, 9.4)

## 2. Product description

### 2.1 Product description

Glasroc F FIRECASE consists of gypsum incorporating a tissue of glass fibre immediately below the surface of the board. The core is reinforced with glass fibre rovings and paper pulp. Glasroc F FIRECASE is a specialist board product and has a square edge on the long edges and has short edges sawn straight. Glasroc F FIRECASE is a high performance glass fibre reinforced gypsum board that is used predominantly as part of the British Gypsum FIRECASE structural steel encasement system, giving up to 120 minutes fire protection. It is also used in the GypLyner ENCASE system, achieving up to 180 minutes fire protection. This specialist board is one of the products within our specialist board range that is certified to BES 6001 achieving a rating of 'Very Good'.

### 2.2 Application

Specialist boards have been developed for demanding applications calling for high levels of combined fire, moisture and impact resistance. The unique properties of this exceptionally fine-surfaced, non-paper faced gypsum board provide solutions for a range of applications, from frameless encasement of steelwork for advanced fire protection, thermal insulation of semi-exposed soffits and the lining of steel-framed walls in industrial buildings, to the creation of aesthetically inspiring curved structures.

### 2.3 Technical data

Glasroc F FIRECASE conforms to EN 15283-1 Gypsum boards with fibrous reinforcement – Definitions, requirements and test methods.

Type GM: Gypsum boards with mat reinforcement.

Type F: Gypsum boards with mat reinforcement with improved core adhesion at high temperature.

Type H1: Gypsum boards with mat reinforcement with reduced water absorption rate.

BBA approved (No 93/2935).

<b>EN CLASSIFICATION</b>	GM-F GM-H1
<b>NOMINAL DENSITY</b>	The assumed density is 904 kg/m <sup>3</sup> (13.56 kg/m <sup>2</sup> ) of 15mm FIRECASE.
<b>THERMAL CONDUCTIVITY</b>	0.30 W/mK
<b>SHEAR STRENGTH</b>	NPD
<b>WATER VAPOUR RESISTANCE</b>	10μ
<b>CLASS OF REACTION TO FIRE PERFORMANCE</b>	A1

#### Certifications:

**ISO 9001:2008** Quality Management System

**ISO 14001:2004** Environmental Management System

**BES 6001:Issue 2** Responsible Sourcing of Construction Products

**BS OHSAS 18001:2007** Occupational Health and Safety Management

## 2.4 Placing on the market/Application rules

Glasroc F FIRECASE conforms to EN 15283:2008 + A1:2009 Gypsum boards with fibrous reinforcement – Definitions, requirements and test methods.

## 2.5 Delivery status

The EPD refers to 15mm thick Glasroc F FIRECASE

## 2.6 Base materials/Ancillary materials

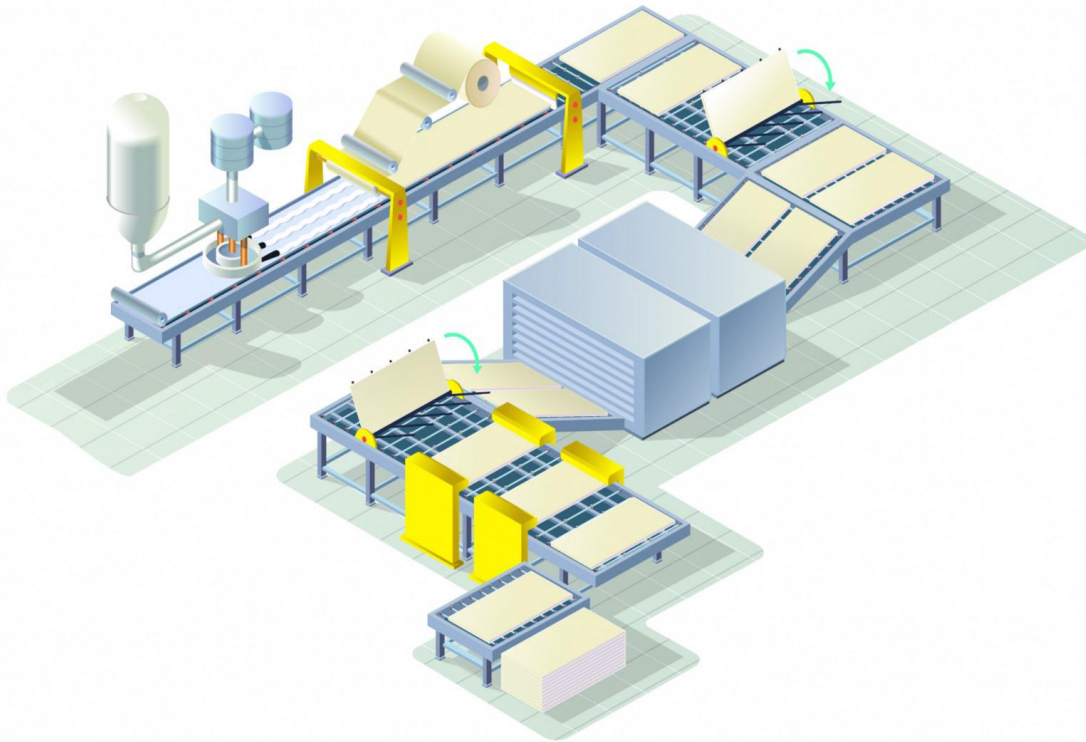
PARAMETER	PART	QUANTITY (kg/FU)
<b>GYPSUM</b>	97.9%	13.275
<b>ADDITIVES</b>	2.1%	0.285
<b>TOTAL</b>	<b>100%</b>	<b>13.56</b>
<b>PACKAGING: WOODEN PALLET</b>	0.487kg per m <sup>2</sup> board	0.487
<b>AT INSTALLATION: SCREWS</b>	11 per m <sup>2</sup> board	0.015
<b>AT INSTALLATION: JOINTING COMPOUND</b>	0.35kg per m <sup>2</sup> board	0.35
<b>AT INSTALLATION: JOINTING TAPE</b>	1.5m per m <sup>2</sup> board	0.00063

15mm Glasroc F FIRECASE contains 97.9% gypsum in a blend of desulphurised gypsum (DSG) and scrap material. Recycled gypsum (DSG and scrap material) makes up 100% of the gypsum blend in 15mm Glasroc F FIRECASE.

No additives used are classed as substances of concern, but as proprietary information they are not listed specifically.

## 2.7 Manufacture

15mm Glasroc F FIRECASE is manufactured using a continuous production process.



The initial materials are homogeneously mixed to form a gypsum slurry that is spread via multiple hose outlets onto a glass fibre mat on a moving belt conveyor. A second glass fibre mat is fed onto the production line from above to form the glass reinforced board. The glass reinforced board continues along the production line where it is finished, dried, and cut to size.

British Gypsum plants are managed through ISO9001:2008 certified Quality Management Systems.

## 2.8 Environment and health during manufacture

At British Gypsum, Health and Safety is our core value. The Company's aim is always to be injury-free. A target of zero accidents at work for employees, visitors and contractors is set by the business.

In all aspects of the Company's activities, the Health and Safety at Work Act and relevant Regulations and Codes of Practice are complied with. In addition there are a number of definitive Company Safety Procedures and together these determine the minimum standards expected by the Company. In order to achieve this, close co-operation with representatives of the relevant enforcement agencies is ensured.

British Gypsum plants are managed through BS OHSAS 18001:2007 Occupational Health and Safety Management Systems. To ensure that the Company's objectives are achieved, documented safety management systems are employed at each operational site and within the central functions. These include a systematic identification of hazards, assessment of the risks and the development of safe systems of work to eliminate or reduce any risks to an acceptable level. Audits and inspections are used to monitor standards of safety management, adherence to the law and company procedures.

British Gypsum plants are managed through ISO 14001:2004 certified Environmental Management Systems.

British Gypsum has energy, water, waste and recycling targets: based on 2013 levels, by the end of 2014 a 1% reduction in the Energy Performance Index (carbon reduction) and a 5% reduction per tonne of product in water usage and waste creation are aimed for. A target of zero non-recovered waste by 2015 at production sites is also set by the business. Saint-Gobain launched a Group-wide Water Policy in 2011. The aim of the policy is to extract minimum resources and work towards 'zero discharge' of industrial process water in liquid form, while avoiding the creation of new impacts on other environments or stakeholders.

## **2.9 Product processing/Installation**

### **General**

It is important to observe appropriate health and safety legislation when working on site, i.e. personal protective clothing and equipment, etc. The following notes are intended as general guidance only. In practice, consideration must be given to design criteria requiring specific project solutions.

### **Handling**

Manual off-loading of this product should be carried out with care to avoid unnecessary strain. For further information please refer to the Manual Handling section of the SITE BOOK or Manual Handling Guide, available to download from <http://www.british-gypsum.com>

### **Cutting**

This product may be cut using a plasterboard saw or by scoring with a sharp knife and snapping the board over a straight edge. Holes for switch or socket boxes should be cut out before the boards are fixed using a utility saw or sharp knife. When cutting boards, power and hand tools should be used with care and in accordance with the manufacturers' recommendations. Power tools should only be used by people who have been instructed and trained to use them safely. Appropriate personal protective equipment should be used.

### **Fixing**

Fix boards with decorative side out to receive joint treatment or a skim plaster finish. Lightly butt boards together. Never force boards into position. Install fixings not closer than 13mm from cut edges and 10mm from bound edges. Position cut edges to internal angles whenever possible, removing paper burrs with fine sandpaper. Stagger horizontal and vertical board joints between layers by a minimum of 600mm. Locate boards to the centre line of framing where this supports board edges or ends.

## **2.10 Packaging**

Glasroc F FIRECASE is supplied on returnable 100% recyclable pallets. All pallets are FSC certified.

## **2.11 Condition of use**

When installed in accordance with British Gypsum recommendations, Glasroc F FIRECASE maintains its mechanical and physical properties for its entire useful life. Direct contact with water should be avoided.

## **2.12 Environment and health during use**

Glasroc F FIRECASE is an article and not classified according to CLP.

## **2.13 Reference service life**

FIRECASE specialist board is expected to last the service life of a building (60 years), as documented in Code for Sustainable Homes.

## **2.14 Extraordinary effects**

### **Fire**

The surfaces of Glasroc F FIRECASE are designated Class 0 and (for the purposes of the national Building Regulations, UK Building Regulations, 2006, Approved Document B).

### **Water**

Glasroc F FIRECASE is unsuitable for use in areas subject to continuously damp or humid conditions and must not be used to isolate dampness. Specialist boards are not suitable for use in temperatures above 49°C, but can be subjected to freezing conditions without risk of damage.

### **Mechanical destruction**

Glasroc F FIRECASE is intended for commercial applications and is a stable product with no significant adverse environmental effects. The products should be installed according to British Gypsum's installation guidelines.

Also refer to section 2.3 Technical data.

## **2.15 Re-use phase**

Glasroc F FIRECASE can be recycled through British Gypsum's dedicated Plasterboard Recycling service: 0800 6335040, [bgprs@saint-gobain.com](mailto:bgprs@saint-gobain.com)

## **2.16 Disposal**

Waste from gypsum specialist boards is normally classified as 'non-hazardous, non-inert' and is fully recyclable. Recycling of the product through British Gypsum's dedicated Plasterboard Recycling Service is strongly recommended. Other methods of disposal are available. If a container of gypsum is sent to landfill, it must be deposited in a separate Monocell. The European waste catalog code is 17 08 02. Always seek the advice of a trained and competent professional.

## **2.17 Further information**

British Gypsum, East Leake, Loughborough, Leicestershire. LE12 6HX  
0115 945 1000  
<http://www.british-gypsum.com>

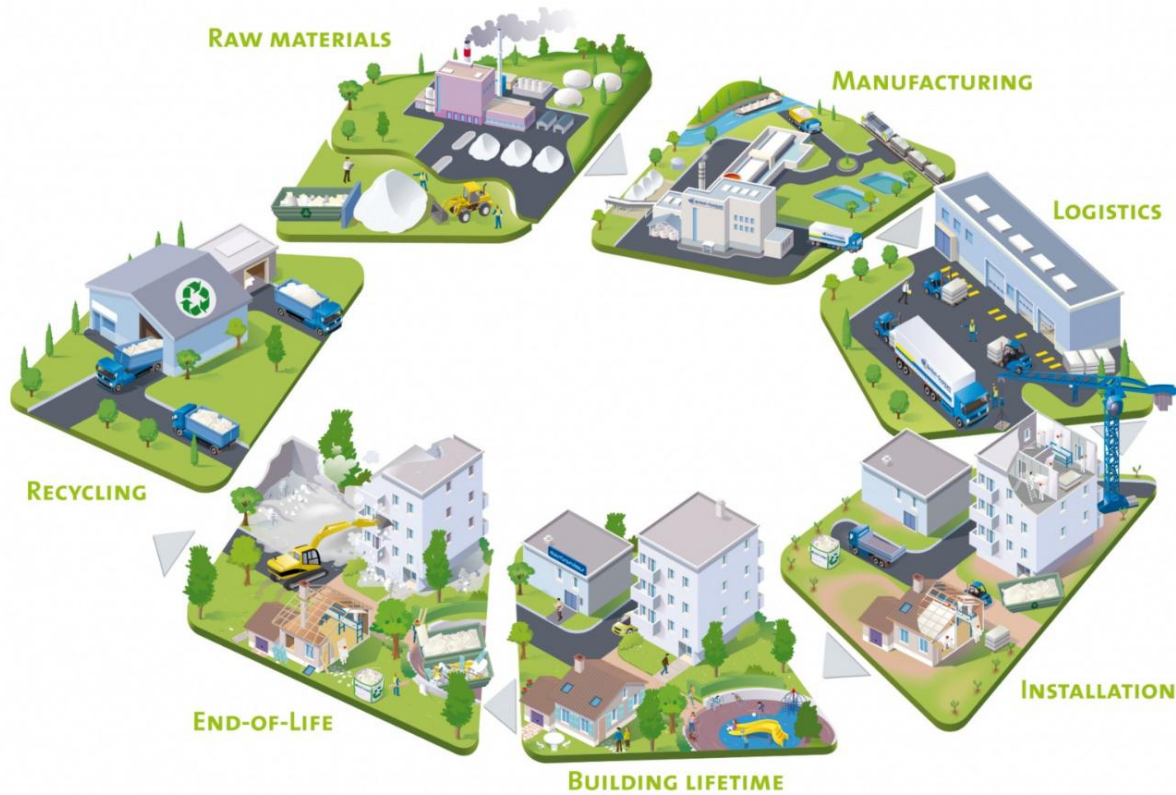
### 3. LCA calculation rules

3.1	<b>FUNCTIONAL UNIT / DECLARED UNIT</b>	The declared unit is 1m <sup>2</sup> of 15mm thick Glasroc F FIRECASE. The assumed density is 904 kg/m <sup>3</sup> (13.56 kg/m <sup>2</sup> ) of 15mm FIRECASE.
3.2	<b>SYSTEM BOUNDARIES</b>	Cradle to Grave: Mandatory stages = A1-3, A4-5, B1-7, C1-4.
3.3	<b>ESTIMATES AND ASSUMPTIONS</b>	Primary data was gathered from the only production site in the UK. The distance to a waste disposal site is assumed to be 32km. The end of life and installation waste handling is taken from the Environment Agency's draft report 'An investigation into the disposal and recovery of gypsum waste'.
3.4	<b>CUT-OFF RULES</b>	Data for recycled waste (waste that isn't landfilled or incinerated) is not included in this model, only the transport to the waste recycling centre. Whatever waste is recycled in the Product stage (A1 – A3) is below the cut off limit (1%).
3.5	<b>BACKGROUND DATA</b>	All primary product data was provided by British Gypsum. All secondary data was retrieved using TEAM software using Ecoinvent 2.2 (2010) and DEAM (2006) databases.
3.6	<b>DATA QUALITY</b>	Primary data was gathered from British Gypsum production figures for one site in the United Kingdom during the 2012 calendar year. A 2008 fuel mix for electricity usage in the UK was assumed for the production site.
3.7	<b>PERIOD UNDER REVIEW</b>	The data is representative of the manufacturing processes of 2012.
3.8	<b>ALLOCATIONS</b>	All production data has been calculated on a mass basis. DSG is allocated by economics.
3.9	<b>COMPARABILITY</b>	A comparison or an evaluation of EPD data is only possible where EN 15804 has been followed and the same building context and product-specific characteristics of performance are taken into account and the same stages have been included in the system boundary. According to EN 15804, EPD of construction products may not be comparable if they do not comply with this standard. According to ISO 21930, EPDs might not be comparable if they are from different programmes.



## 4. LCA: Scenarios and additional technical information

### *Flow diagram of the Life Cycle*



### Product stage, A1-A3

#### Description of the stage:

The product stage of the specialist board products is subdivided into three modules: A1, A2 and A3 respectively “raw material supply”, “transport” and “manufacturing”.

#### Description of scenarios and additional technical information:

##### **A1, raw material supply**

This includes the extraction and processing of all raw materials and energy which occur upstream from the 15mm Glasroc F FIRECASE manufacturing process.

##### **A2, transport to the manufacturer**

The raw materials are transported to the manufacturing site. The modelling includes road, boat and/or train transportations (average values) of each raw material.

##### **A3, manufacturing**

This module includes the manufacture of products and the manufacture of packaging. The production of packaging material is taken into account at this stage. The processing of any waste arising from this stage is also included.

## Construction process stage, A4-A5

### Description of the stage:

The construction process stage is divided into two modules: A4, transport to the building site and A5, installation of 15mm Glasroc F FIRECASE in the building.

### A4, transport to the building site:

The table below quantifies the parameters for transporting 15mm Glasroc F FIRECASE from production gate to the building site. The distance quoted is a weighted average for transport of 15mm Glasroc F FIRECASE in Great Britain in 2012, from the production site to building sites, calculated using postcodes of our customers and quantity of product travelled to each.

PARAMETER	VALUE (expressed per functional/declared unit)
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.	44 tonne articulated large goods vehicle (including payload of 24 tonnes) Diesel consumption 38 litres per 100 km travelled
Distance	240 km
Capacity utilisation (including empty returns)	100% volume capacity 30% empty returns
Bulk density of transported products	904 kg/m <sup>3</sup> (13.56 kg/m <sup>2</sup> )
Volume capacity utilisation factor	1

### A5, installation in the building:

The table overleaf quantifies the parameters for installing 15mm Glasroc F FIRECASE at the building site. All installation materials and their waste processing are included.

Figures quoted in the table are based on the Environment Agency's draft report 'An investigation into the disposal and recovery of gypsum waste'. This states that 83% of construction and demolition waste is sent to landfill with the remaining 17% recycled.

British Gypsum encourages recycling construction waste.

PARAMETER	VALUE (expressed per functional/declared unit)
Ancillary materials for installation (specified by materials)	Screws: 0.015 kg Jointing Compound: 0.35 kg Jointing Tape: 0.00063 kg
Water use	0.11 m <sup>3</sup>
Other resource use	None
Quantitative description of energy type (regional mix) and consumption during the installation process	0 energy use at installation
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	15mm Glasroc F FIRECASE: 1.356 kg Screws: 0 kg Jointing Compound: 0.035 kg Jointing Tape: 0.000063 kg Pallet: 0.487 kg
Output materials (specified by type) as results of waste processing at the building site e.g. of collection for recycling, for energy recovering, disposal (specified by route)	15mm Glasroc F FIRECASE: 0.231 kg to recycling 15mm Glasroc F FIRECASE: 1.125 kg to landfill Screws: 0 kg Jointing Compound: 0.035 kg to recycling Jointing Tape: 0.000063 kg to landfill Pallet: 0.487 kg to recycling

## Use stage (excluding potential savings), B1-B7

### Description of the stage:

The use stage is divided into the following stages:

**B1, use or application of the installed product**

**B2, maintenance**

**B3, repair**

**B4, replacement**

**B5, refurbishment**

**B6, operational energy use**

**B7, operational water use**

### Description of scenarios and additional technical information:

The product has a reference service life of 60 years. This assumes that the product will last in situ with no requirements for maintenance, repair, replacement or refurbishment throughout this period. Glasroc F FIRECASE is a passive building product; therefore it has no impact on this stage.

## End-of-life stage C1-C4

### Description of the stage:

This includes the following stages:

- C1, de-construction, demolition**
- C2, transport to waste processing**
- C3, waste processing for reuse, recovery and/or recycling**
- C4, disposal**

### Description of scenarios and additional technical information:

The end of life scenarios have been taken from the Environment Agency's 'An investigation into the disposal and recovery of gypsum waste' draft report.

### End-of-life:






PARAMETER	VALUE (expressed per functional/declared unit) / DESCRIPTION
Collection process specified by type	2.31 kg collected separately and down-cycled 11.25 kg collected with mixed de-construction and demolition waste to landfill
Recovery system specified by type	2.31 kg for recycling
Disposal specified by type	11.25 kg to landfill
Assumptions for scenario development (e.g. transportation)	44 tonne articulated large goods vehicle (including payload of 24 tonnes) Diesel consumption 38 litres per 100 km travelled 32 km from construction/demolition site to waste handler

## 5. LCA: Results per m<sup>2</sup> of 15mm Glasroc F FIRECASE









Description of the system boundary (X = Included in LCA, MND = Module Not Declared)

PRODUCT STAGE			CONSTRUCTION STAGE		USE STAGE								END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
Raw material supply	Transport	Manufacturing	Transport	Construction-Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-recovery	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	MND	









**RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: per m<sup>2</sup> of 15mm Glasroc F FIRECASE**

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	
 Global Warming Potential (GWP) - <i>kg CO<sub>2</sub> equiv/FU</i>	3.0E+00	1.9E-01	4.5E-01	0	0	0	0	0	0	0	0	1.9E-02	0	0	MND
The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas, carbon dioxide, which is assigned a value of 1.															
 Ozone Depletion (ODP) <i>kg CFC 11 equiv/FU</i>	2.3E-07	1.3E-07	6.7E-08	0	0	0	0	0	0	0	0	1.3E-08	0	0	MND
Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons), which break down when they reach the stratosphere and then catalytically destroy ozone molecules.															
 Acidification potential (AP) <i>kg SO<sub>2</sub> equiv/FU</i>	8.1E-03	1.1E-03	1.6E-03	0	0	0	0	0	0	0	0	1.1E-04	0	0	MND
Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production, heating and transport.															
 Eutrophication potential (EP) <i>kg (PO<sub>4</sub>)<sup>3-</sup> equiv/FU</i>	6.2E-04	2.8E-04	1.9E-04	0	0	0	0	0	0	0	0	2.8E-05	0	7.3E-04	MND
Excessive enrichment of waters and continental surfaces with nutrients, and the associated adverse biological effects.															
 Photochemical ozone creation (POPC) <i>kg Ethene equiv/FU</i>	8.8E-04	2.5E-05	1.3E-04	0	0	0	0	0	0	0	0	2.5E-06	0	0	MND
Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.															
 Abiotic depletion potential for non-fossil resources (ADP-elements) - <i>kg Sb equiv/FU</i>	3.2E-07	3.1E-11	3.7E-08	0	0	0	0	0	0	0	0	3.0E-12	0	0	MND
 Abiotic depletion potential for fossil resources (ADP-fossil resources) - <i>MJ/FU</i>	4.4E+01	2.4E+00	6.7E+00	0	0	0	0	0	0	0	0	2.3E-01	0	0	MND
Consumption of non-renewable resources, thereby lowering their availability for future generations.															

RESULTS OF THE LCA - RESOURCE USE: per m<sup>2</sup> of 15mm Glasroc F FIRECASE

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	
 Use of renewable primary energy as energy carrier (PERE) - MJ/FU	9.6E+00	5.2E-04	1.5E+00	0	0	0	0	0	0	0	0	5.1E-05	0	0	MND
 Use of renewable primary energy resources as material utilisation (PERM) - MJ/FU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MND
Total use of renewable primary energy resources (PERT) - MJ/FU	9.6E+00	5.2E-04	1.5E+00	0	0	0	0	0	0	0	0	5.1E-05	0	0	MND
 Use of non-renewable primary energy as energy carrier (PENRE) - MJ/FU	5.0E+01	2.4E+00	7.5E+00	0	0	0	0	0	0	0	0	2.3E-01	0	0	MND
 Use of non-renewable primary energy as material utilisation (PENRM) - MJ/FU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MND
Total use of non-renewable primary energy (PENRT) - MJ/FU	5.0E+01	2.4E+00	7.5E+00	0	0	0	0	0	0	0	0	2.3E-01	0	0	MND
 Use of secondary material (SM) - kg/FU	6.1E-03	0	2.8E-02	0	0	0	0	0	0	0	0	0	0	0	MND
 Use of renewable secondary fuels (RSF) - MJ/FU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MND
 Use of non-renewable secondary fuels (NRSF) - MJ/FU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MND
 Use of net fresh water (FW) - m <sup>3</sup> /FU	1.8E-02	2.2E-04	3.3E-03	0	0	0	0	0	0	0	0	2.2E-05	0	0	MND

**RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: per m<sup>2</sup> of 15mm Glasroc F FIRECASE**

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	
 Hazardous waste disposed (HWD) - kg/FU	8.2E-05	5.4E-05	5.0E-04	0	0	0	0	0	0	0	0	5.3E-06	0	0	MND
 Non-hazardous(including inert) waste disposed (NHWD) - kg/FU	1.2E-01	2.6E-04	1.2E-01	0	0	0	0	0	0	0	0	2.5E-05	0	1.1E+01	MND
 Radioactive waste disposed (RWD) - kg/FU	4.1E-05	3.8E-05	1.7E-05	0	0	0	0	0	0	0	0	3.7E-06	0	0	MND
 Components for re-use (CRU) - kg/FU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MND
 Materials for recycling (MFR) - kg/FU	2.8E-01	1.1E-06	1.9E+00	0	0	0	0	0	0	0	0	1.1E-07	0	0	MND
 Materials for energy recovery (MER) -kg/FU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	MND
 Exported electrical energy (EEE) - MJ/FU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MND
 Exported thermal energy (EET) - MJ/FU	1.6E-05	0	8.2E-03	0	0	0	0	0	0	0	0	0	0	0	MND

**READING GUIDE:**

Reading Example: -1.2E-05 = 1.2 x 10<sup>-5</sup>

## 6. LCA results interpretation

The Product stage (A1-A3) is responsible for over 80% of 15mm Glasroc F FIRECASE in its lifetime for the following impacts: Global Warming, Non-renewable resources consumption, Energy consumption and Water consumption. The Installation stage (A5) is responsible for over 12% of the same impacts. Waste production is primarily attributed to the End-of-life stage. This is due to 83% of 15mm Glasroc F FIRECASE modelled as being landfilled at the end of its life.

59.80MJ of the total primary energy comes from the Product stage of the life cycle. The main fuel used on British Gypsum sites is natural gas. It accounts for over 80% of energy usage.

Production methods utilise only abstracted borehole water in the manufacturing process.

British Gypsum send zero gypsum waste to landfill.



[1] This indicator corresponds to the abiotic depletion potential of fossil resources.

[2] This indicator corresponds to the total use of primary energy.

[3] This indicator corresponds to the use of net fresh water.

[4] This indicator corresponds to the sum of hazardous, non-hazardous and radioactive waste disposed.



## 7. Requisite evidence

### VOC emissions

The standards used widely in Europe to evaluate VOC levels in specialist board products are EN13419 & ISO16000. Based upon indicative testing of a sample of specialist board products, Gyproc specialist board is estimated not to contain a VOC content or Formaldehyde content which exceeds the requirements of European voluntary labelling schemes connected with indoor air quality.

## 8. References

### General principles

The International EPD® System PCR 2012:01 version 1.2 for Construction Products and CPC 54 construction services.

### PCR

Institut Bauen und Umwelt e.V., Königswinter (pub.): Product Category Rules for Building-Related Products and Services from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report, 1.2, April 2013.

Institut Bauen und Umwelt e.V., Königswinter (pub.): Product Category Rules for Building-Related Products and Services from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part B: Requirements on the EPD for Plasterboard. Version 1.5, October 2013.

### Standards:

#### BES 6001: Issue 2

Responsible sourcing of construction products.

#### BS:OHSAS 18001:2007

Occupational Health and Safety Management.

#### Code for Sustainable Homes 2008

Setting the standard in sustainability for new homes

#### EA 2012 Draft Report

An investigation into the disposal and recovery of gypsum waste. Environment Agency.

#### EN 13419 series

Indoor Air – superseded by ISO 16000.

#### EN 15283:2008 + A1:2009

Gypsum boards with fibrous reinforcement – Definitions, requirements and test methods.

#### EN 15804:2012-04

Sustainability of construction works – Environmental Product Declarations – Core rules for the product category of construction products.

#### ISO 9001:2008

Quality management systems - Requirements.

#### ISO 14001:2004

Environmental management systems – Requirements with guidance for use.

#### ISO 14025:2011-10

Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

**ISO 16000 series**  
Indoor Air.

**Regulations:**

**The Building Regulations, 2006 edition incorporating 2010 and 2013 amendments**  
Schedule 1, Approved Document B (Fire Safety) Volume 1 Dwelling House.

**The Building Regulations, 2006 edition incorporating 2007, 2010 and 2013 amendments**  
Schedule 1, Approved Document B (Fire Safety) Volume 2 Buildings other than Dwelling Houses.