Environmental Product Declaration

In accordance with ISO 14025:2006, ISO 21930:2017 and EN 15804:2012+A2:2019/AC:2021

Gyproc WallBoard 9.5 mm

Version: 1
Publication Date: 2024/03/11
Validity: 5 years
Valid Until: 2029/03/10

EPD Type: Multiple Products (average results)
Scope of the EPD®: Cradle-to-gate with options, Module C and Module D

Manufacturer Head Office Address: East Leake, Loughborough, LE12 6HX
This product is manufactured at multiple locations.

Programme: The International EPD® System
Programme Operator: EPD International AB
System Registration Number: S-P-12365

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

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General information

Company information

Manufacturer: Saint-Gobain Construction Products UK Limited t/a British Gypsum
Sites of manufacture: East Leake, Leicestershire, LE12 6HX / Kirkby Thore, Penrith, CA10 1XU / Robertsbridge, East Sussex, TN32 5LA / Sherburn, Leeds, LS25 6EZ
Management system-related certification: ISO 14001 [1], ISO 50001 [2], ISO 9001 [3], BES 6001 [4]

Product name: Gyproc WallBoard 9.5 mm
EPD for multiple products: ☐ No ☒ Yes, the EPD represents the following products:
Gyproc WallBoard 9.5 mm (S/E 3000 x 1200 x 9.5); Gyproc WallBoard 9.5 mm (S/E 2400 x 1200 x 9.5); Gyproc WallBoard 9.5 mm (S/E 1800 x 900 x 9.5); Gyproc WallBoard 9.5 mm (T/E 2400 x 1200 x 9.5); Gyproc WallBoard 9.5 mm (T/E 1800 x 900 x 9.5)
UN CPC code: 314 – Boards and panels

Owner of the declaration: Saint-Gobain Construction Products UK Limited t/a British Gypsum
EPD® prepared by: Charnett Chau (charnett.chau@saint-gobain.com) and Sila Danik Dirihan (sila.danik@saint-gobain.com)

Geographical scope of the EPD®: United Kingdom (Production), Global (Use and End-of-life)
EPD® registration number: S-P-12365
Declaration issued: 2024/03/11 valid until 2029/03/10
Demonstration of verification: an independent verification of the declaration was made, according to ISO 14025:2010 [5]. This verification was external and conducted by the following third party based on the PCR mentioned above.

Programme information

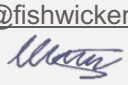
Programme:	The International EPD® System [6]
Address:	EPD International AB - Box 210 60 - SE-100 31 Stockholm - Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

CEN standard EN 15804:2012 + A2:2019 [7] and ISO 21930:2017 [8] serve as the Core Product Category Rules (PCR)

Product category rules (PCR): PCR 2019:14 Construction Products, version 1.3.2 [9]

PCR review was conducted by: The Technical Committee of the International EPD® System
See www.environdec.com for a list of members.
Chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact - Contact via info@environdec.com

Independent third-party verification of the declaration and data, according to ISO 14025:2006:
☐ EPD process certification ☒ EPD verification

Third-party verifier: Matthew Fishwick, Fishwick Environmental Ltd.
Email: matt@fishwickenvironmental.com | Approved by: The International EPD® System
Signature: 

Procedure for follow-up of data during EPD validity involves third-party verifier: ☐ Yes ☒ No

The EPD owner has sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Product description

Product description and description of use

This Environmental Product Declaration (EPD®) describes the environmental impacts of 1 m^2 of Gyproc WallBoard 9.5 mm.

Gyproc WallBoard 9.5 mm is a plasterboard product range, where the edge type can either be squared or tapered and the length and width dimensions vary but the thickness are all 9.5 mm. Like other Gyproc plasterboards, they are intended to be used as lining for buildings in walls and ceiling. They are designed to be suitable for most applications where normal fire, structure and acoustic levels are specified. It is additionally suitable for direct decoration or a Thistle plaster finish.

The products within the range are produced with similar recipes amongst the variations and at the multiple manufacturing sites where they are produced (East Leake, Kirkby Thore, Robertsbridge and Sherburn). Hence, the EPD covers the average production (weighted) of Gyproc WallBoard 9.5 mm as the representative product for the product range.

Technical data/physical characteristics:

Reaction to fire	A2-s1, d0	As EN 520:2004 [10]
Maximum continuous temperature exposure	49°C	
Thermal conductivity	0.190 W/(m.K)	
Longitudinal flexural strength	400 N	
Transverse flexural strength	160 N	
Water vapour permeability	10 μ	

For further information on the product please visit the Gyproc WallBoard 9.5 mm web page [11].

Declaration of the main product components and/or materials

All raw materials contributing more than 5% to any environmental impact are listed in the following table.

Product components	Mass (%)	Post-consumer material content (%)	Biogenic carbon content (%)***
Calcined Gypsum (incl. water)	> 93	0*	0
Paper	< 5	0**	0.44
Additives	< 2	0	< 0.1
Packaging materials	**Mass (kg)**	**Mass (%)**	**Biogenic carbon content (%)*** **
Plastic covering	0.00002	< 0.1	0
Wooden pallet	0.112	> 99	0.41

*Through Saint-Gobain British Gypsum's Plasterboard Recycling Scheme, only construction (pre-consumer) plasterboard waste is retrieved to produce calcined gypsum (stucco). The pre-consumer recycle content is 3.7%.
**The worst-case of 0% post-consumer material is declared due to the amount of post-consumer content used by our suppliers is unknown. Within Sphera and ecoinvent datasets, recycled content was modelled.
***Biogenic carbon content in % is equivalent to carbon mass per overall mass of material (kgC/kg).

During the life cycle of the product, any hazardous substance listed in the "Candidate List of Substances of Very High Concern (SVHC) for authorization" [12] has not been used in a percentage higher than 0.1% of the weight of the product. The verifier and the program operator do not make any claim nor have any responsibility for the legality of the product.

Raw material category	Product (mass %)	Packaging (mass %)
Metals	0	0
Minerals	> 80	0
Fossil materials	≤ 0.5	0
Bio-based materials	> 5	100
Other organic materials	0	0
Other inorganic materials	< 15	0

LCA calculation information

TYPE OF EPD	Cradle-to-gate with options (Modules A4-A5, Module B), Modules C1-C4 and Module D.
DECLARED UNIT	1 m^2 of Gyproc WallBoard 9.5 mm, as installed. Mass conversion: 6.8 kg/m^2 (actual range: 6.4 – 7.1 kg/m^2).
SYSTEM BOUNDARIES	A1-A5, B1-B7, C1-C4 and D.
REFERENCE SERVICE LIFE (RSL)	60 years. By default, it corresponds to standard building design life (in the UK), and it is noted that internal metal profiles are in place for this duration.
CUT-OFF RULES	In the case that there is not enough information, the process energy and materials representing less than 1% of the whole energy and mass used can be excluded (if they do not cause significant impacts). The addition of all the inputs and outputs excluded cannot be bigger than 5% of the mass and energy used, as well as emissions to the environment, per module. The construction of plants, production of machines and transportation systems, (i.e. any infrastructure) are excluded since the related flows are supposed to be negligible compared to the production of the product when compared to the system's lifetime level. However, we note that some generic datasets used in the LCA model may include capital goods and infrastructure within their system boundaries. Flows related to human activities such as employee transport are also excluded.
ALLOCATIONS	The allocation criteria are based on the mass flow of products and co-products – i.e. mass allocation between the different product ranges produced at each manufacturing site. Where raw materials and energy usage cannot be directly attributed to individual products the total quantity used in the factory was divided by the total mass of products produced to achieve materials and energy per kilogram of product. The polluter pays and modularity principles have been followed. The impact arising from the treatment of waste generated within the system boundaries is allocated to the product until waste reaches the end-of-waste state.
GEOGRAPHICAL COVERAGE AND TIME PERIOD	Scope: UK (production), Global (use and disposal). Data is collected from production sites located in the UK – East Leake, Kirkby Thore, Robertsbridge and Sherburn by Saint-Gobain British Gypsum. Data collected for the year: August 2022 - July 2023 (all sites except Kirkby Thore, May 2023 - October 2023).
BACKGROUND DATA SOURCE	Sphera Managed LCA Content v2023.1 [13] and ecoinvent v.3.9.1 (cut-off version) [14].
SOFTWARE	Sphera LCA for Experts v10 [15].
LCA METHODOLOGY	In addition to EN 15804:2019+A2 and PCR 2019:14, the study was carried out in accordance with ISO 14040:2006 [16], ISO 14044:2006 [17], and GPI for the International EPD® system [18]. Note: EN 15804 reference package based on EF 3.1 has been used [19].
MULTIPLE PRODUCT APPROACH	Average production. Weighted according to production volumes.

According to EN 15804:2012+A2:2019, EPDs of construction products may not be comparable if they do not comply with this standard. According to ISO 21930:2017 EPDs might not be comparable if they are from different programmes.

LCA scope

System boundaries (X=included. MND=module not declared).

Specific data used and variations are based on the GWP-GHG indicator.

	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
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	EU/GLO		GB	GB/GLO													

Specific data used*	> 80%
Variation products**	< 4%
Variation sites***	< 9%

*Share of specific data that is specified according to PCR 2019:14. We gathered site-specific data on the generation of electricity provided by contracted suppliers (using Guarantee of Origin), transportation data on distances, means of transportation, load factor, fuel/other energy consumption at the site. The value in the table is calculated on the share of impact deriving from LCI data from databases on transportation and energy ware that are combined with actual transportation and energy parameters.
**This value is the maximum GWP-GHG variation between the products within the product range at a single manufacturing site.
***This value is the maximum GWP-GHG variation between the same products produced at different sites, it is calculated by 1 minus the lowest impact over the highest impact generated for the product.

Life cycle stages

A1-A3, Product stage

Modules A1-A3 sit within the product stage of a building's life cycle, where raw and secondary materials are extracted and processed (A1) before being transported (A2) to manufacturing facilities for the fabrication of building products (A3). Here we detail A1-A3 for Gyproc WallBoard 9.5 mm produced at Saint-Gobain British Gypsum manufacturing sites in East Leake, Kirkby Thore, Robertsbridge and Sherburn. Information on the supply of materials and manufacturing of the product(s) were primary data from Saint-Gobain British Gypsum. Secondary data from Sphera (2023.1) and ecoinvent (3.9.1) databases were used to obtain LCIs for input materials and the processing of waste materials. Electricity used at the manufacturing sites was modelled based on the power mix purchased with a Guarantee of Origin (GO) from the UK market.

The aggregation of the modules A1, A2, and A3 is a possibility considered by the EN 15804 standard. This rule is applied in this EPD.

A1: Raw materials supply
Raw materials that are required to manufacture Gyproc plasterboards are supplied from various countries around the world. These raw materials can be categorised as “natural” materials (e.g. natural gypsum) and “processed” materials (additives).

The use of electricity, fuels, and auxiliary materials in production is taken into account too. The environmental profile of these energy carriers is modelled for local conditions.

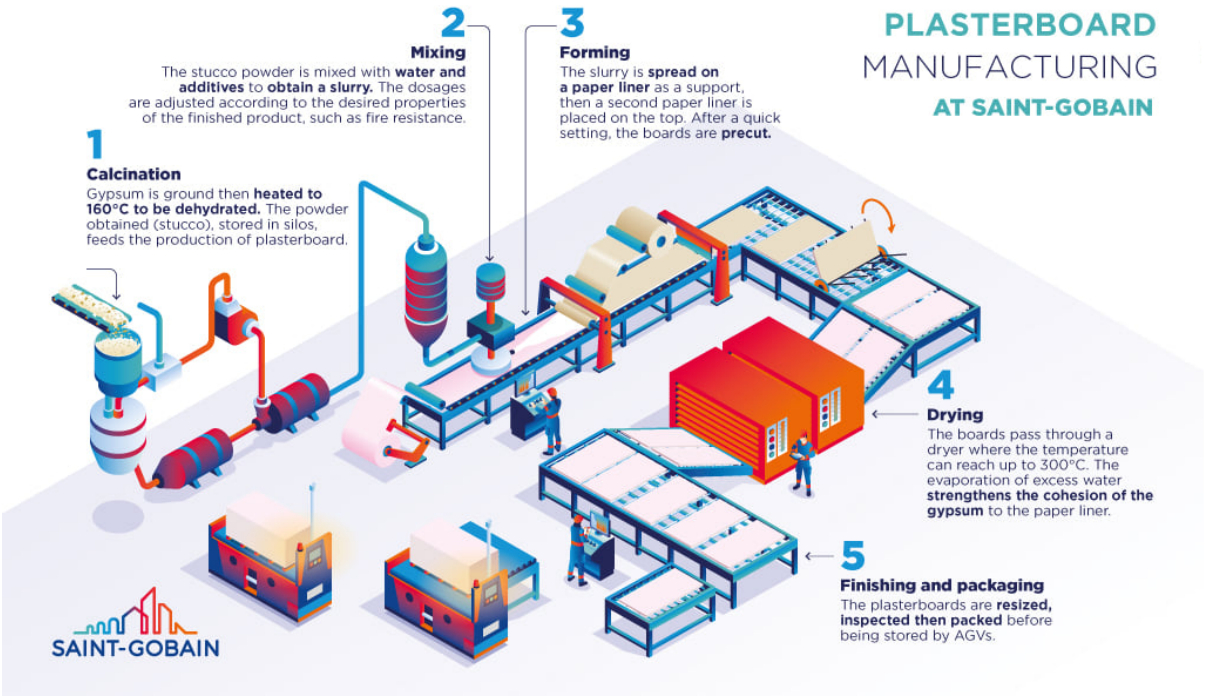
A2: Transport to the manufacturer
The raw materials are transported to the manufacturing site. The modelling includes road, boat and/or train transportation of each raw material.

A3: Manufacturing
See Process Flow Diagram for a complete breakdown of the manufacturing process.

In A3, other processes modelled include:

- The processing of waste arising from the manufacturing process. How manufacturing waste is processed was based on waste reports from waste contractors, however, where processes are unavailable from Sphera and ecoinvent databases, the worst-case process was used (landfill and incineration).
- The combustion of refinery products, such as natural gas, is related to the production process.
- Packaging-related flows in the production process and all upstream packaging are included in the manufacturing module, i.e. wooden pallets and polypropylene packaging.
    - In addition to the production of packaging material, the supply and transport of packaging material are also considered in the LCA model. They are reported and allocated to the module where the packaging is applied. Data on packaging waste created during this step are then generated.

Manufacturing process flow diagram



Manufacturing in detail

The figure above shows the main processes associated with manufacturing Gyproc plasterboards at Saint-Gobain British Gypsum manufacturing sites.

Plasterboards are made by, firstly, mixing calcined gypsum (stucco), made from natural gypsum rocks or synthetic gypsum, with both wet and dry additives to achieve the specific properties desired for the plasterboard. The mixture is then applied to the bottom paper and covered with top paper sequentially to form the unset “plasterboard” (edge glue used to seal the paper edges). To set the calcined gypsum and additive mixture, the plasterboard is dried in driers. Once set, the plasterboards are ready for palletising, storing and distributing.

To produce calcined gypsum, Saint-Gobain British Gypsum uses gypsum rocks that are quarried and/or mined locally in the UK or Spain, and plasterboard waste. The materials are milled and homogenised before being sent to the calcination process. Alternatively, the ground gypsum deriving from the homogenisation process can be used as a dry mineral or mixed with additives to form an accelerator or a plaster product. If synthetic gypsum is required for the production of stucco, then delivered synthetic gypsum is calcined instead of natural gypsum.

A4-A5, Construction process stage

The construction process is divided into two modules: A4, transport to the building site and A5, installation in the building.

A4: Transport to the building site

Distribution distances of products were obtained by mapping the transport distances from each manufacturing site to the client. The average distance was then taken along with the typical mode and load of transport to form the transport scenario. All clients were included in the calculation from the year 2022-2023, no assumptions or cut-offs were made to find the average distribution distance. Additionally, it is assumed that no product is lost, broken or wasted during transportation due to the efficiency of our courier and our packing process.

NATIONAL PARAMETERS (99.99% OF SALES)	VALUE
Fuel type and vehicle type e.g. long-distance truck, boat, etc.	Long-distance truck: 28t payload capacity Euro 0 – 6 mix Fuel type: Diesel
Distance	171 km
Average load weight	26 tonnes
Empty return	36%
Average utilisation	93%

EXPORT PARAMETERS (0.01% OF SALES)	VALUE
Fuel type and vehicle type e.g. long-distance truck, boat, etc.	Long-distance truck: 28t payload capacity Euro 0 – 6 mix Fuel type: Diesel Container ship: 43000 t payload capacity Fuel type: Heavy fuel oil
Road distance	2220 km
Truck average load weight	26 tonnes
Empty return	0%
Truck average utilisation	93%
Sea distance	50 km
Shipping average utilisation	0.7

A5: Installation in the building

The scenario for the installation of 1 m^2 of Gyproc plasterboard was developed in consultation with Saint-Gobain British Gypsum's technical team and product technical data sheets for the average installation requirements for typical plasterboard products. The installation typically requires screws and jointing materials to fill any gaps. 10% product loss was assumed, and the resupply of the losses was modelled. UK Waste Statistics and Saint-Gobain British Gypsum's data on recycled content within stucco were used to determine the waste destination of plasterboards at the construction stage.

PARAMETER	VALUE/DESCRIPTION (PER m^2)
Ancillary materials for installation	Screws: 2 units Joint tape: 0.0092 kg Joint compound: 0.67 kg
Water use	0.28 L
Wastage output from installation	Product and install materials: 0.75 kg (37% British Gypsum recycling scheme, 58% other recycling, 5% landfilled) Pallet: 0.112 kg (worst-case: 100% landfilled) Polypropylene: 0.00002 kg (worst-case: 100% landfilled)
Direct emissions	None

B1-B7, Use stage

The use stage, related to the building fabric is separated into seven modules. The following describes the use of Gyproc plasterboards over its RSL, 60 years, which corresponds to a building's standard life span.

B1: Use (or application of the installed product)

This model represents any emissions to the environment of the installed product. Emissions to the environment are not attributable to Gyproc plasterboards.

B2: Maintenance; B3: Repair; B4: Replacement; B5: Refurbishment

No maintenance, repair, replacement or refurbishment is required after the implementation of Gyproc plasterboards. Therefore, no impact has been accounted for in these modules.

B6: Operational energy use; B7: Operational water use

Gyproc plasterboards are not related to any electricity or water use during the operation of the building. Therefore, no impact has been accounted for in these modules.

C1-C4, End of life stage

The end-of-life scenario for Gyproc plasterboards was developed based on Saint-Gobain's own knowledge and confirmation of customers for the deconstruction and demolition of the product from the building (C1). While UK waste statistics show that 96.8% of all mineral waste from construction and demolition is recovered, Saint-Gobain understands that plasterboard waste at demolition stage, due to major contamination is not recoverable. Hence it is assumed that all plasterboards are landfilled at the end-of-life stage.

C1: Deconstruction, demolition

The deconstruction and/or dismantling process of Gyproc plasterboards is assumed to be deconstructed as part of the entire building. These processes mainly use energy for mechanical operations. In our case, a small amount of energy is considered 0.0437 MJ/kg.

C2: Transport to waste processing

As there is no data for the transport of waste after its use, the default distance of 100 km of an average truck used at 85% capacity was assumed.

C3: Waste processing for reuse, recovery and/or recycling
No plasterboard is assumed to be recovered for reuse or recycling at the end-of-life stage.

C4: Disposal
100% landfill was assumed for Gyproc plasterboards.

PARAMETER	VALUE/DESCRIPTION
Collection process specified by type	100% collected with mixed deconstruction and demolition waste
Recovery system specified by type	0% recycled
Disposal specified by type	100% to landfill
Assumptions for scenario development (e.g. transportation)	Waste is transported 100 km by truck from deconstruction or demolition sites to either landfill

D, Reuse/Recovery/Recycling potential

As a percentage of Gyproc plasterboard is made from secondary materials (construction plasterboard waste), and any product waste produced during construction is assumed mostly recycled, loads and benefits for using secondary material and recycling plasterboard were calculated in Module D. It was assumed that recovered plasterboard is processed and used to replace natural gypsum rock.

LCA results

As specified in EN 15804:2012+A2:2019 and the Product-Category Rules, the environmental impacts are declared and reported using the baseline characterisation factors from the EC-JRC. Specific data has been supplied by the plant, and generic data come from Sphera and ecoinvent databases.

All emissions to air, water, and soil, and all materials and energy used have been included.

The estimated impact results are only relative statements which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins or risks.

It is discouraged to use the results of Modules A1-A3 without considering the results of other modules, particularly, Module C.

All figures refer to a declared unit of 1 m^2 Gyproc WallBoard 9.5 mm, as installed.

The following results correspond to a product range manufactured at four sites: East Leake, Kirkby Thore, Robertsbridge and Sherburn.

Environmental impacts

Environmental indicators	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				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	D Reuse, recovery, recycling
Climate change total [kg CO_2 eq.]	1.05E+00	9.21E-02	6.05E-01	0	0	0	0	0	0	0	1.31E-03	4.64E-02	0	7.26E-01	-1.01E-03
Climate change (fossil) [kg CO_2 eq.]	1.81E+00	9.27E-02	4.29E-01	0	0	0	0	0	0	0	1.31E-03	4.67E-02	0	1.15E-01	-1.01E-03
Climate change (biogenic) [kg CO_2 eq.]	-7.69E-01	-1.38E-03	1.74E-01	0	0	0	0	0	0	0	1.24E-06	-6.88E-04	0	6.10E-01	-3.06E-06
Climate change (land use change) [kg CO_2 eq.]	6.20E-03	8.61E-04	9.36E-04	0	0	0	0	0	0	0	2.33E-08	4.32E-04	0	3.36E-04	-3.42E-06
Ozone depletion [kg CFC-11 eq.]	6.27E-09	8.14E-15	1.16E-09	0	0	0	0	0	0	0	9.84E-17	6.08E-15	0	4.33E-16	-1.02E-14
Acidification terrestrial and freshwater [Mole of H+ eq.]	5.27E-03	6.30E-04	9.36E-03	0	0	0	0	0	0	0	3.80E-06	2.80E-04	0	8.38E-04	-4.98E-06
Eutrophication freshwater [kg P eq.]	7.20E-05	3.39E-07	1.19E-05	0	0	0	0	0	0	0	2.91E-10	1.71E-07	0	2.01E-07	-3.58E-09
Eutrophication marine [kg N eq.]	1.66E-03	3.11E-04	4.58E-04	0	0	0	0	0	0	0	7.26E-07	1.37E-04	0	2.16E-04	-2.17E-06
Eutrophication terrestrial [Mole of N eq.]	1.71E-02	3.44E-03	4.22E-03	0	0	0	0	0	0	0	7.95E-06	1.51E-03	0	2.37E-03	-2.53E-05
Photochemical ozone formation - human health [kg NMVOC eq.]	4.53E-03	5.84E-04	1.57E-03	0	0	0	0	0	0	0	2.28E-06	2.58E-04	0	6.53E-04	-5.60E-06
Resource use, mineral and metals [kg Sb eq.][1]	5.63E-06	6.04E-09	1.30E-06	0	0	0	0	0	0	0	1.23E-11	3.10E-09	0	1.05E-08	-1.21E-10
Resource use, energy carriers [MJ][1]	2.84E+01	1.26E+00	6.53E+00	0	0	0	0	0	0	0	1.61E-02	6.36E-01	0	1.53E+00	-1.41E-02
Water deprivation potential [m^3 world equiv.][1]	4.50E-01	1.07E-03	1.37E-01	0	0	0	0	0	0	0	2.24E-06	5.64E-04	0	1.22E-02	-2.53E-05

[1] The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

Resources use

Resources use indicators	PRODUCT STAGE	CONSTRUCTION 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	D Reuse, recovery, recycling
Use of renewable primary energy (PERE) [MJ]	6.93E+00	8.95E-02	1.41E+00	0	0	0	0	0	0	0	7.44E-05	4.63E-02	0	2.01E-01	-5.42E-03
Primary energy resources used as raw materials (PERM) [MJ]	8.13E+00	0	8.13E-01	0	0	0	0	0	0	0	0	0	0	0	0
Total use of renewable primary energy resources (PERT) [MJ]	1.51E+01	8.95E-02	2.22E+00	0	0	0	0	0	0	0	7.44E-05	4.63E-02	0	2.01E-01	-5.42E-03
Use of non-renewable primary energy (PENRE) [MJ]	2.81E+01	1.27E+00	6.50E+00	0	0	0	0	0	0	0	1.62E-02	6.38E-01	0	1.53E+00	-1.41E-02
Non-renewable primary energy resources used as raw materials (PENRM) [MJ]	3.04E-01	0	3.04E-02	0	0	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources (PENRT) [MJ]	2.84E+01	1.27E+00	6.53E+00	0	0	0	0	0	0	0	1.62E-02	6.38E-01	0	1.53E+00	-1.41E-02
Input of secondary material (SM) [kg]	5.79E-01	0	6.14E-02	0	0	0	0	0	0	0	0	0	0	0	0
Use of renewable secondary fuels (RSF) [MJ]	5.61E-27	0	5.61E-28	0	0	0	0	0	0	0	0	0	0	0	0
Use of non-renewable secondary fuels (NRSF) [MJ]	6.58E-26	0	6.58E-27	0	0	0	0	0	0	0	0	0	0	0	0
Use of net fresh water (FW) [m^3]	1.49E-02	9.86E-05	3.78E-03	0	0	0	0	0	0	0	9.68E-08	5.07E-05	0	3.87E-04	-2.48E-06

Waste category and output flows

Waste category and output flows	PRODUCT STAGE	CONSTRUCTION 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	D Reuse, recovery, recycling
Hazardous waste disposed (HWD) [kg]	2.16E-03	4.69E-12	2.17E-04	0	0	0	0	0	0	0	5.96E-14	1.98E-12	0	2.34E-08	-6.27E-06
Non-hazardous waste disposed (NHWD) [kg]	1.74E-01	1.83E-04	4.98E-01	0	0	0	0	0	0	0	3.81E-06	9.73E-05	0	7.71E+00	-6.27E-06
Radioactive waste disposed (RWD) [kg]	1.00E-04	1.64E-06	6.05E-05	0	0	0	0	0	0	0	1.94E-08	1.19E-06	0	1.75E-05	-5.33E-07
Components for re-use (CRU) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Materials for Recycling (MFR) [kg]	4.53E-02	0	7.35E-01	0	0	0	0	0	0	0	0	0	0	0	0
Material for Energy Recovery (MER) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported electrical energy (EEE) [MJ]	7.90E-04	0	7.90E-05	0	0	0	0	0	0	0	0	0	0	0	0
Exported thermal energy (EET) [MJ]	1.48E-03	0	1.48E-04	0	0	0	0	0	0	0	0	0	0	0	0

Optional indicators

	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				D REUSE, RECOVERY, RECYCLING
Optional indicators	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	D Reuse, recovery, recycling
Respiratory inorganics [Disease incidences]	1.32E-07	3.75E-09	2.97E-08	0	0	0	0	0	0	0	2.96E-11	1.67E-09	0	1.04E-08	-6.84E-09
Ionising radiation - human health [kBq U235 eq.][2]	3.36E-02	2.37E-04	1.17E-02	0	0	0	0	0	0	0	2.77E-06	1.78E-04	0	1.80E-03	-5.80E-05
Ecotoxicity freshwater [CTUe][3]	9.71E+00	8.91E-01	3.56E+00	0	0	0	0	0	0	0	1.18E-02	4.56E-01	0	8.73E-01	-8.14E-03
Cancer human health effects [CTUh][3]	1.04E-09	1.80E-11	1.96E-10	0	0	0	0	0	0	0	3.03E-13	9.27E-12	0	1.30E-10	-2.23E-13
Non-cancer human health effects [CTUh][3]	1.21E-08	7.94E-10	3.13E-09	0	0	0	0	0	0	0	8.06E-12	4.12E-10	0	1.37E-08	-6.46E-12
Land use [Pt]	2.22E+01	5.28E-01	6.07E+00	0	0	0	0	0	0	0	5.60E-05	2.66E-01	0	3.20E-01	-1.11E-02

[2] The ionising radiation category deals mainly with the eventual impact of low-dose ionising radiation on the human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, or radioactive waste disposal in underground facilities. Potential ionising radiation from the soil, radon and some construction materials is also not measured by this indicator.

[3] The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Additional voluntary indicators from EN 15804 (according to ISO 21930:2017)

	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				REUSE, RECOVERY RECYCLING
Environmental indicators	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	D Reuse, recovery, recycling
Climate Change (GWP-GHG) [kg CO_2 eq.][4]	1.82E+00	9.35E-02	4.30E-01	0	0	0	0	0	0	0	1.31E-03	4.71E-02	0.00E+00	1.15E-01	-1.01E-03

[4] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

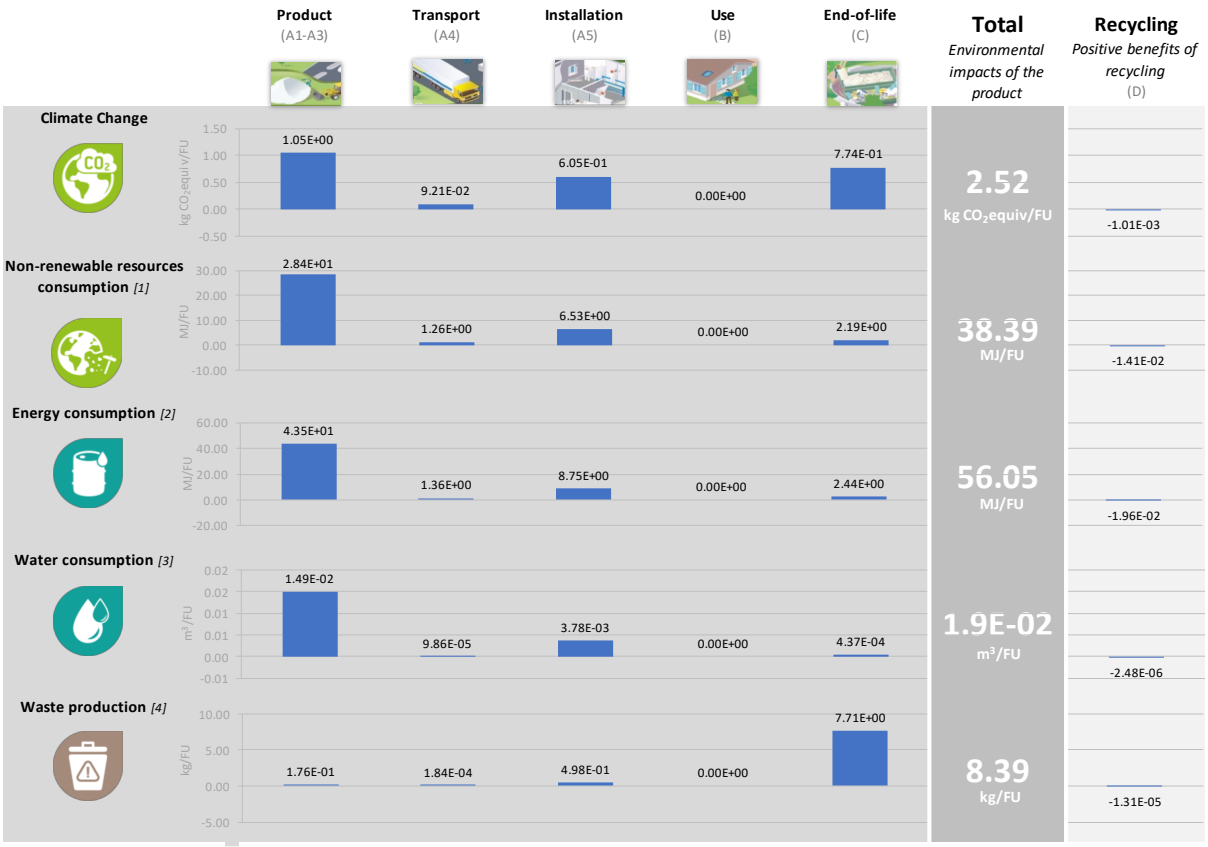
Information on biogenic carbon content

Biogenic carbon content		PRODUCT STAGE A1 / A2 / A3
	Biogenic carbon content in product [kg]	1.71E-1
	Biogenic carbon content in packaging [kg]	4.59E-2

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

LCA interpretation

The following figure refers to a declared unit of 1 m^2 Gyproc WallBoard 9.5 mm, as installed, and for application within buildings for an expected average service life of 60 years.



[1] This indicator corresponds to the abiotic depletion potential of fossil resources (Resource use, energy carriers MJ/FU).
[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.

Climate change total

The figure above breaks down the GWP of Gyproc WallBoard 9.5 mm into clear categories to understand the modules that cause the largest environmental impact. Most impact derives from the Product Stage (Modules A1-A3), contributing 41.6% to the total Climate Change impact value (Modules A to C). Further analysis showed that Module A3 contributes 1.36 kCO_2eq/kg (54.2% of the total), which derives mainly from the using fossil-based fuels, such as natural gas and LPG on site. (Biogenic carbon uptake during Module A1, raw materials generation stage reduced the overall Module A1-A3 contribution). The next highest contributing modules are Module C and Module A5 (30.7% and 24.0% of the total, respectively). Most of the impact from Module A5 stems from the resupply of product losses

during installation and the disposal of packaging, while in Module C, most impact derived from the release of biogenic carbon content upon disposing of the product. Module A4 contributes 3.66% to the total; this is attributed to using diesel for transporting the product. Lastly, Module B contributes 0% to the overall impact as no activities are assumed to be taken to maintain and repair the product during its useful life in a building.

Non-renewable resources consumptions

The consumption of non-renewable resources has the highest value during the product stage (Module A1-A3) – 74.0% of the total. The main source of non-renewable resource consumption is the use of fossil fuel, natural gas and LPG for the production of plasterboards in Module A3 (57.9% of the total). Fossil fuel is likely used in generating raw materials, resulting in Module A1 contributing 12.9% to the total impact. The next highest Module is Module A5 (17.0% of the total) where the main contributor is the resupply of product losses during installation. Module C contributes 5.69% to this impact category, which derives mainly from landfilling the product and transporting the waste. Module A4 contributes 3.29% to the total; this is attributed to using diesel for transporting the product. Lastly, Module B contributes 0% to the overall impact as no activities are assumed to be taken to maintain and repair the product during its useful life in a building.

Energy consumption

Energy consumption combines both the total use of renewable primary energy resources and the total use of non-renewable primary energy resources. The figure illustrates that the product stage (A1-A3) contributes the largest (77.6% of the total). The highest contributing module is Module A1 (35.3% of the total) and Module A3 is the second highest (39.9% of the total). This also can be attributed to the energy requirements for producing raw materials, particularly paper, and the use of energy calcine gypsum and dry plasterboards. The next highest Module is Module A5 (15.6% of the total) where the main contributor is the resupply of product losses during installation. Module C contributes 4.35% to this impact category, which derives mainly from landfilling the product and transporting the waste. Module A4 contributes 2.42% to the total; this is attributed to transporting the product. Lastly, Module B contributes 0% to the overall impact as no activities are assumed to be taken to maintain and repair the product during its useful life in a building.

Water consumption

Water consumption is the use of freshwater throughout the product's life cycle. The highest contributor is the product stage (Module A1-A3) – 77.6% of the total. The main sources of water consumption are within Module A1 (55.4% of the total), further analysis showed that the generation of paper, starch, sugar and foam agents contributes highly to this impact category. In Module A3, where it contributes 21.8% to the total, water is ultimately mixed with dry ingredients to produce the gypsum core. Besides Module A5 (19.7% of the total), which accounts for the remanufacture of lost products, all other modules, contribute < 5%.

Waste production

Waste production includes all hazardous, non-hazardous and radioactive waste disposed of. Waste production does not follow the same trend as the other environmental impacts. 92.0% of the waste generated is at Module C, where the product is assumed landfilled at its end of life. 1.66% of waste derives from Module A1, mostly from generating PNS, starch and foam agents used in plasterboard production. In Module A5 (5.94% of the total), packaging was modelled to be landfilled as a worst-case scenario, and some wasted products as landfilled also.

Additional information

Electricity information

TYPE OF INFORMATION	DESCRIPTION
Electricity purchaser	Saint-Gobain Construction Products UK Ltd.
Electricity provider	Smartest Energy
Electricity mix	Hydro – 9.53%; Wind – 58.2%, Solar PV – 14.61%, Waste to Energy – 4.98%, Biomass – 4.08%, Thermal – 8.22%, Anaerobic – 0.38%
Reference year	2022 - 2023
Type of dataset	Sphera Database 2023.1, all datasets reference 2022-2023 emissions: Hydro - "GB: Electricity from hydro power Sphera" Thermal and Anaerobic - "GB: Electricity from biogas Sphera" Solar PV - "GB: Electricity from photovoltaic Sphera" Biomass - "GB: Electricity from biomass Sphera" Wind - "GB: Electricity from wind power Sphera" Waste to Energy - "GB: Electricity from waste Sphera"
GWP-GHG **CO_2 emissions kg CO_2 eq. / kWh**	Certificate issue = 0 kg CO_2 / kWh Modelled impact = 0.013 kg CO_2 / kWh

*Saint-Gobain Construction Products UK Ltd. is the entity that Saint-Gobain British Gypsum operate under.

Data quality

Inventory data quality is judged by geographical, temporal, and technological representativeness. To cover these requirements and to ensure reliable results, first-hand industry data crossed with LCA background datasets were used. The data was collected from internal/supplier records and reporting documents from Saint-Gobain British Gypsum. After evaluating the inventory, according to the defined ranking in the LCA report, the assessment reflects good inventory data quality.

Environmental impacts according to EN 15804:2012+A1

The following table presents the results of 1 m^2 Gyproc WallBoard 9.5 mm, as installed. Note that EN 15804:2012+A1 is expired [20].

	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				REUSE, RECOVERY, RECYCLING
Environmental impacts	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	D Reuse, recovery, recycling
Global Warming Potential (GWP) [kg CO_2 eq.]	1.05E+00	9.67E-02	6.17E-01	0	0	0	0	0	0	0	1.38E-03	4.84E-02	0	7.33E-01	-1.09E-03
Ozone depletion (ODP) [kg CFC 11eq.]	5.55E-02	2.79E-03	1.30E-02	0	0	0	0	0	0	0	3.90E-05	1.39E-03	0	3.43E-03	-1.84E-05
Acidification potential (AP) [kg SO_2eq.]	-1.92E-02	4.01E-04	1.59E-02	0	0	0	0	0	0	0	3.27E-06	1.76E-04	0	1.92E-02	-3.65E-06
Eutrophication potential (EP) [kg $(PO_4)^3$-eq.]	1.36E-03	1.39E-04	6.47E-04	0	0	0	0	0	0	0	2.59E-07	6.23E-05	0	8.72E-05	-9.48E-07
Photochemical ozone creation (POCP) - [kg Ethylene eq.]	3.50E-04	-1.94E-04	3.12E-04	0	0	0	0	0	0	0	2.55E-07	-8.22E-05	0	5.19E-05	-3.59E-07
Abiotic depletion potential for non-fossil resources (ADP-elements) [kg Sb eq.]	2.42E-04	1.90E-05	5.14E-04	0	0	0	0	0	0	0	1.13E-07	8.36E-06	0	2.50E-05	-9.12E-08
Abiotic depletion potential for fossil resources (ADP-fossil fuels) [MJ]	2.71E+01	1.29E+00	6.09E+00	0	0	0	0	0	0	0	1.64E-02	6.43E-01	0	1.53E+00	-1.33E-02

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