



## ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025:2006 and  
EN 15804:2012+A2:2019 for:

## Crystacal White Fine (Alpha hemihydrate from synthetic gypsum)

**Version: 1**

**Date of publication: 2023/10/06**

**Validity: 5 years**

**Valid until: 2028/10/05**



THE INTERNATIONAL EPD® SYSTEM

The International EPD®

Programme operator: EPD international AB

System Registration number:

S-P-10286

**EPD Type:** Single Product

**Scope of the EPD®:** Cradle-to-gate with  
options, Module C and Module D



Manufacturer Address: Saint-Gobain Formula,  
Newark, NG24 3BZ



# General Information

## Company and EPD Information

**Manufacturer:** Saint-Gobain Formula

**Site of Manufacture:** Saint-Gobain Formula site located in Newark, UK, NG24 3BZ

**Management System-related Certification:** ISO 14001 [1], ISO 50001 [2], ISO 9001[3]

**Product Name:** Crystacal White Fine [4]

**EPD for Multiple Products:**  No  Yes

**UN CPC CODE:** 374 - Plaster, lime and cement

**Owner of the declaration:** Saint-Gobain Construction Products UK t/a Saint-Gobain Formula

**EPD<sup>®</sup> prepared by:** Charnett Chau ([Charnett.chau@saint-gobain.com](mailto:Charnett.chau@saint-gobain.com)), Daniel Moss ([Daniel.moss@saint-gobain.com](mailto:Daniel.moss@saint-gobain.com)) and Liz Stimpson ([Liz.Stimpson@saint-gobain.com](mailto:Liz.Stimpson@saint-gobain.com))

**Geographical scope of the EPD<sup>®</sup>:** United Kingdom

**EPD<sup>®</sup> registration number:** S-P-10286

**Declaration issued:** 2023/10/06 valid until: 2028/10/05

**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<sup>®</sup> System [6]

**ADDRESS:** EPD International AB - Box 210 60 - SE-100 31 Stockholm - Sweden

**WEBSITE:** [www.environdec.com](http://www.environdec.com)

**E-MAIL:** [info@environdec.com](mailto:info@environdec.com)

CEN standard EN 15804:2012 + A2:2019 [7] serves as the Core Product Category Rules (PCR)

**Product category rules (PCR):** PCR 2019:14 Construction Products, version 1.2 [8]

**PCR review was conducted by:** The Technical Committee of the International EPD<sup>®</sup> System  
See [www.environdec.com](http://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](http://www.environdec.com/contact) - Contact via [info@environdec.com](mailto: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:** Andrew Norton

Director of Renewables – [a.norton@renewables.co.uk](mailto:a.norton@renewables.co.uk)

Approved by: The International EPD<sup>®</sup> System

**Procedure for follow-up of data during EPD validity involves third part 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 kg of Crystacal White Fine (alpha hemihydrate from synthetic gypsum)**.

Crystacal White Fine is a high-strength, unformulated hemihydrate plaster ( $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$ ) produced from synthetic gypsum minerals. It is white in colour. The product is sold for the formulation of dental and medical plasters. As a plaster in general, this product can be employed for multiple applications in the construction sector as well.

Saint-Gobain Formula's Crystacal White Fine is a single product derived from synthetic gypsum using the alpha calcination process at Formula Newark. Hence, a single product EPD is being produced for this product.

### Technical data/physical characteristics:

<b>Bulk Density</b>	1200 kg/m <sup>3</sup>
<b>Average Specific Surface</b>	6000 cm <sup>2</sup> /g

## 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	Weight (%)	Post-consumer material weight (%)
Synthetic Gypsum	> 99	0
Process Aids (residues)	< 1	0
<b>Sum</b>	<b>100</b>	<b>0</b>
Packaging materials	Weight (%)	Weight (kg)
Composed bags (paper and PE)	6.7	0.00044
Corrugated Board	4.2	0.00058
HDPE Wrap	1.6	0.00022
PP Straps	1.6	0.00023
Wood (Pallet)	85.9	0.012

During the life cycle of the product, any hazardous substance listed in the "Candidate List of Substances of Very High Concern (SVHC) for authorization" [9] 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.

## LCA Calculation Information

<b>TYPE OF EPD</b>	Cradle to the gate with options, module C and module D
<b>FUNCTIONAL UNIT</b>	1 kg of Crystacal White Fine (alpha hemihydrate from synthetic gypsum)
<b>SYSTEM BOUNDARIES</b>	Mandatory Stages = A1 to A3, C and D Optional Stages = A4, A5 and B
<b>REFERENCE SERVICE LIFE (RSL)</b>	50 years. By default, it corresponds to standard building design life, and it is noted that plaster products are in place for this duration.
<b>CUT-OFF RULES</b>	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 whole mass and energy used, as well as emissions to the environment occurred. Flows related to human activities such as employee transport are excluded. The construction of plants, production of machines and transportation systems are excluded since the related flows are supposed to be negligible compared to the production of the building product when compared to the system's lifetime level.
<b>ALLOCATIONS</b>	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 Saint-Gobain Formula Newark. 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.
<b>GEOGRAPHICAL COVERAGE AND TIME PERIOD</b>	Scope: UK (production), Global (use and disposal) Data is collected from one production site, Newark Saint-Gobain Formula Data collected for the year: <b>2022</b>
<b>BACKGROUND DATA SOURCE</b>	Sphera v2023.1 [10] and ecoinvent v.3.8 [11]
<b>SOFTWARE</b>	LCA for Experts – Sphera v2023.1 [12]
<b>LCA METHODOLOGY</b>	In addition to EN 15804:2019+A2 and PCR 2019:14, the study was carried out in accordance with ISO 14040:2006 [13], ISO 14044:2006 [14], and GPI for the International EPD® system [15]

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 [16], EPDs might not be comparable if they are from different programmes.

## LCA Scope

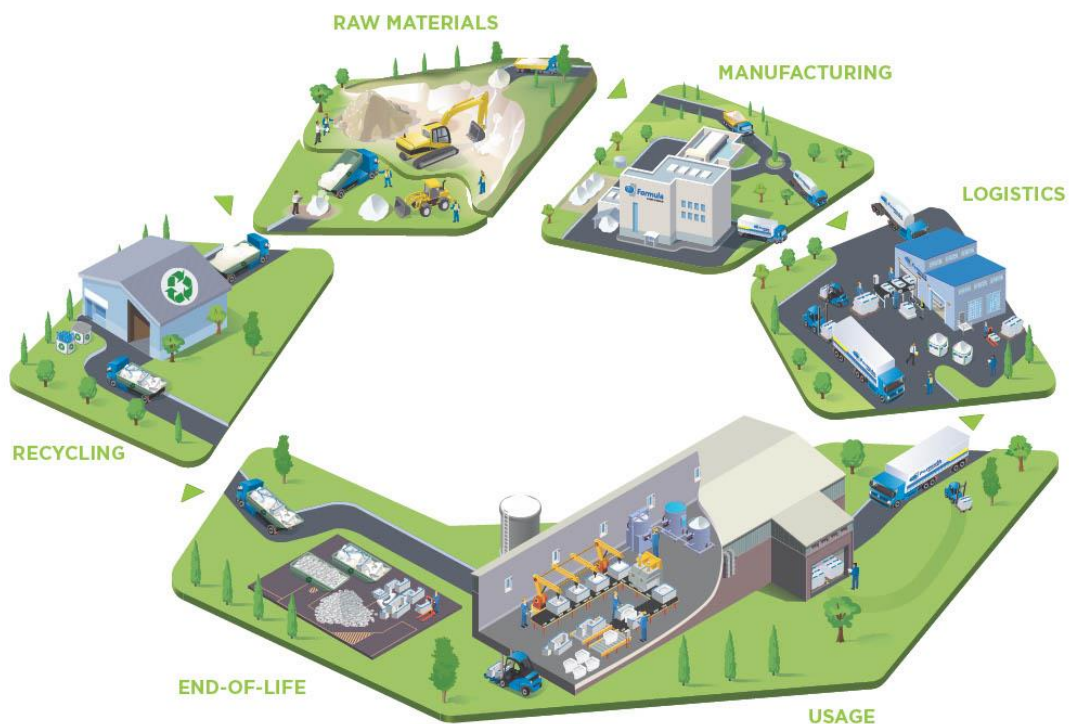
System boundaries (X=included. ND=not declared)

	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
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-28/GLO		GB	EU-28/GLO													
Specific data used	>85%**																
Variation products	<1%																
Variation sites	N/A																

\*While the installation of the product was not modelled, the disposal of packaging was modelled at A5.

\*\*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.

## Life Cycle Stages



## A1-A3, Product Stage

### Description of the 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 a product produced at Formula Newark. Information on the supply of materials and manufacturing of the product were primary data from Saint-Gobain Formula. Secondary data from Sphera (2023.1) and ecoinvent (3.8) databases were used to obtain LCIs for input materials and the processing of waste materials. Electricity used at the Saint-Gobain manufacturing site was modelled based on the power mix purchased with a guarantee of origin (GO)/residue electricity mix from the UK market.

### A1, Raw materials supply

Raw materials that are required to manufacture Crystacal White Fine are supplied from various countries around the world, predominantly in the UK and Europe. These raw materials can be categorised as “virgin” materials (e.g. synthetic gypsum)) and packaging materials (e.g. pallets)

### A2, Transport to the manufacturer

Virgin materials and packaging are transported to the manufacturing site in Newark.

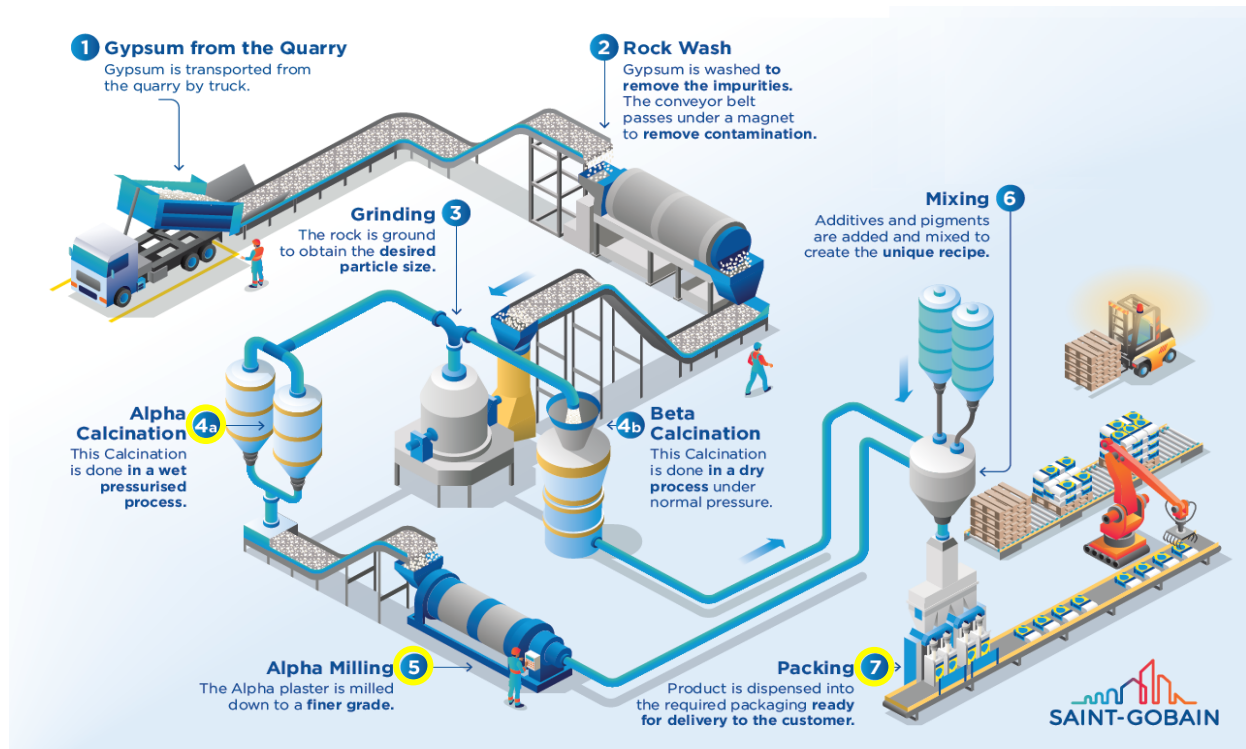
### A3, Manufacturing

At the Newark manufacturing site, synthetic gypsum is fed for wet calcination with process aids to produce Crystacal White Fine.

Auxiliary processes include thermal energy generation for drying before and drying grinding, sieving products into the correct size and other properties, and transportation within the manufacturing site.

## Manufacturing Process Flow Diagram

The system diagram below showcases all the main processes (Steps 1 to 7) that occur at the Saint-Gobain Formula, Newark, production site. Only the steps that are highlighted in yellow are relevant to Crystacal White Fine production.



## A4-A5, Construction Process Stage

**A4, Transport to the building site:** Distribution distances of products were obtained by mapping the transport distances from the Newark 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, no assumptions or cut-offs were made to find the average distribution distance. Additionally, it's assumed that no product is lost, broken or wasted during transportation due to the efficiency of our courier and our packing process.

EXPORT PARAMETERS (100% OF SALES)	VALUE
<b>Fuel type and consumption of vehicle or vehicle type used for transport e.g. long-distance truck, boat, etc.</b>	Long-distance truck: 22t payload capacity
	Euro 0 – 6 mix
	Fuel type: Diesel
	Container Ship: 43000 t payload capacity
	Fuel type: Heavy fuel oil
<b>Road Distance</b>	435 km
<b>Truck Average Load Weight</b>	18.7 tonnes
<b>Truck Average Utilisation</b>	0.85
<b>Sea Distance</b>	1123 km
<b>Shipping Average Utilisation</b>	0.7
<b>Bulk density of transported products*</b>	900 kg/m <sup>3</sup>

## A5, Installation in the building:

Due to the product's multiple uses in buildings, product installation was not modelled. However, the disposal of packaging materials upon the use of the product was evaluated. The worst-case scenario where packaging is disposed to landfill was modelled.

PARAMETER	QUANTITY PER KG OF CRSYTACAL WHITE FINE
<b>Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)</b>	Bag: 0.00044 kg Pallet: 0.0125 kg Corrugated Board Mats: 0.0006 kg HDPE Wraps: 0.0002 kg Polypropylene Straps: 0.0002 kg
<b>PACKAGING ONLY</b>	

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

The use stage, related to the building fabric includes:

**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 plaster products.

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

Plaster products in construction are assumed a product working life of 50 years (as the building lifespan). Once installation is complete, no actions or technical operations are required during the use stage until the end-of-life stage. Therefore, these products have no impact on these modules.

**B6:** Operational Energy Use; **B7:** Operational Water Use

plaster products are not related to any electricity or water use during the operation of the building.

## C1-C4, End of Life Stage

### Description of the stage:

The end-of-life scenario for four product ranges 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). The worst-case scenario was assumed for the final disposal of the product, which is landfill.

**C1:** The deconstruction and/or dismantling process of Crystacal White Fine 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/m<sup>2</sup>.

**C2:** As there is no data for the transport of waste after its use phase, the default distance of 100 km of an average truck used at 85% capacity was assumed.

**C3:** No waste processing for reuse, recovery and recycling was assumed.

**C4:** The worst-case scenario where 100% landfill of the product was assumed. Since Crystacal White Fine does not contain biogenic carbon, no balancing of biogenic carbon is needed.

## Description of the scenarios and additional technical information for the end of life:

PARAMETER	VALUE/DESCRIPTION
<b>Collection process specified by type</b>	100% collected with mixed deconstruction and demolition waste sent to landfill
<b>Recovery system specified by type</b>	0 kg recycled
<b>Disposal specified by type</b>	1 kg to landfill
<b>Assumptions for scenario development (e.g. transportation)</b>	Waste is transported 100 km by truck from deconstruction/demolition sites to landfill

## D, Reuse/Recovery/Recycling Potential

No secondary materials were used to manufacture this product and 100% of the product is landfilled at its EoL. There is no reuse, recovery, or recycling of this product. Hence, no recycling benefits are reported in Module D.

## 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 ILCD. 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.

All figures refer to a declared unit of 1 kg of Crystacal White Fine.











The following results correspond to a product range manufactured in a single plant: Newark.

# 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 [kg CO2 eq.]	2.17E-01	9.78E-02	2.59E-02	0	0	0	0	0	0	0	4.48E-03	6.80E-03	0	1.46E-02	0
	Climate change (fossil) [kg CO2 eq.]	2.34E-01	9.82E-02	3.36E-04	0	0	0	0	0	0	0	4.47E-03	6.83E-03	0	1.50E-02	0
	Climate change (biogenic) [kg CO2 eq.]	-1.85E-02	-1.36E-03	2.56E-02	0	0	0	0	0	0	0	1.63E-06	-9.46E-05	0	-4.99E-04	0
	Climate change (land use change) [kg CO2 eq.]	8.14E-04	8.95E-04	1.10E-06	0	0	0	0	0	0	0	3.65E-07	6.24E-05	0	4.67E-05	0
	Ozone depletion [kg CFC-11 eq.]	1.37E-09	1.26E-14	4.67E-11	0	0	0	0	0	0	0	8.06E-10	8.76E-16	0	3.82E-14	0
	Acidification terrestrial and freshwater [Mole of H+ eq.]	3.72E-04	2.07E-04	1.73E-06	0	0	0	0	0	0	0	2.91E-05	1.37E-05	0	1.07E-04	0
	Eutrophication freshwater [kg P eq.]	4.82E-06	3.53E-07	3.86E-08	0	0	0	0	0	0	0	1.27E-07	2.46E-08	0	3.03E-08	0
	Eutrophication marine [kg N eq.]	1.37E-04	8.71E-05	7.60E-06	0	0	0	0	0	0	0	1.27E-05	5.66E-06	0.00E+00	2.75E-05	0.00E+00
	Eutrophication terrestrial [Mole of N eq.]	1.47E-03	9.88E-04	6.07E-06	0	0	0	0	0	0	0	1.39E-04	6.45E-05	0.00E+00	3.03E-04	0.00E+00
	Photochemical ozone formation - human health [kg NMVOC eq.]	3.33E-04	1.86E-04	3.06E-06	0	0	0	0	0	0	0	3.86E-05	1.22E-05	0.00E+00	8.31E-05	0.00E+00
	Resource use, mineral and metals [kg Sb eq.] <sup>1</sup>	1.92E-07	6.37E-09	5.73E-10	0	0	0	0	0	0	0	1.75E-09	4.43E-10	0.00E+00	6.93E-10	0.00E+00
	Resource use, energy carriers [MJ] <sup>1</sup>	3.59E+00	1.32E+00	5.22E-03	0	0	0	0	0	0	0	5.02E-02	9.17E-02	0.00E+00	2.00E-01	0.00E+00
	Water deprivation potential [m³ world equiv.] <sup>1</sup>	1.67E-02	1.17E-03	1.68E-04	0	0	0	0	0	0	0	1.03E-04	8.14E-05	0.00E+00	1.65E-03	0.00E+00

<sup>1</sup> 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]	1.80E+00	9.59E-02	1.84E-04	0	0	0	0	0	0	0	3.09E-04	6.68E-03	0	3.26E-02	0
 Primary energy resources used as raw materials (PERM) [MJ]	4.21E-01	0	0	0	0	0	0	0	0	0	0	0	0	0	0
 Total use of renewable primary energy resources (PERT) [MJ]	2.22E+00	9.59E-02	1.84E-04	0	0	0	0	0	0	0	3.09E-04	6.68E-03	0	3.26E-02	0
 Use of non-renewable primary energy (PENRE) [MJ]	3.59E+00	1.32E+00	5.23E-03	0	0	0	0	0	0	0	5.02E-02	9.21E-02	0	2.00E-01	0
 Non-renewable primary energy resources used as raw materials (PENRM) [MJ]	2.55E-02	0	0	0	0	0	0	0	0	0	0	0	0	0	0
 Total use of non-renewable primary energy resources (PENRT) [MJ]	3.59E+00	1.32E+00	5.23E-03	0	0	0	0	0	0	0	5.02E-02	9.21E-02	0	2.00E-01	0
 Input of secondary material (SM) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
 Use of renewable secondary fuels (RSF) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
 Use of non-renewable secondary fuels (NRSF) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
 Use of net fresh water (FW) [m3]	7.41E-04	1.05E-04	4.00E-06	0	0	0	0	0	0	0	2.39E-06	7.31E-06	0	5.05E-05	0


## Waste Category & Output flows

Waste Category & 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]	2.53E-07	4.09E-12	5.68E-09	0	0	0	0	0	0	0	1.38E-07	2.85E-13	0	4.36E-12	0
 Non-hazardous waste disposed (NHWD) [kg]	2.34E-02	2.02E-04	1.63E-02	0	0	0	0	0	0	0	3.11E-04	1.40E-05	0	1.00E+00	0
 Radioactive waste disposed (RWD) [kg]	5.72E-06	2.47E-06	2.44E-08	0	0	0	0	0	0	0	3.45E-07	1.72E-07	0	2.28E-06	0
 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]	5.85E-04	0	0	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]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
 Exported thermal energy (EET) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

## Optional Indicators



Optional 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
Respiratory inorganics [Disease incidences]	3.23E-09	1.33E-09	2.73E-11	0	0	0	0	0	0	0	5.76E-10	8.89E-11	0	1.31E-09	0
Ionising radiation - human health [kBq U235 eq.]	1.77E-03	3.69E-04	1.93E-05	0	0	0	0	0	0	0	2.29E-04	2.57E-05	0	2.64E-04	0
Ecotoxicity freshwater [CTUe]	3.52E+00	9.35E-01	1.06E-02	0	0	0	0	0	0	0	3.04E-02	6.51E-02	0	1.09E-01	0
Cancer human health effects [CTUh]	8.37E-11	1.92E-11	1.50E-13	0	0	0	0	0	0	0	7.06E-12	1.33E-12	0	1.68E-11	0
Non-cancer human health effects [CTUh]	2.02E-09	1.06E-09	4.37E-12	0	0	0	0	0	0	0	3.53E-11	7.36E-11	0	1.85E-09	0
Land use [Pt]	2.44E+00	5.50E-01	9.13E-03	0	0	0	0	0	0	0	6.49E-03	3.83E-02	0	4.86E-02	0

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

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 [kg CO2 eq.] <sup>2</sup>	2.35E-01	9.91E-02	3.38E-04	0	0	0	0	0	0	0	4.47E-03	6.90E-03	0	1.51E-02	0

<sup>2</sup> 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.

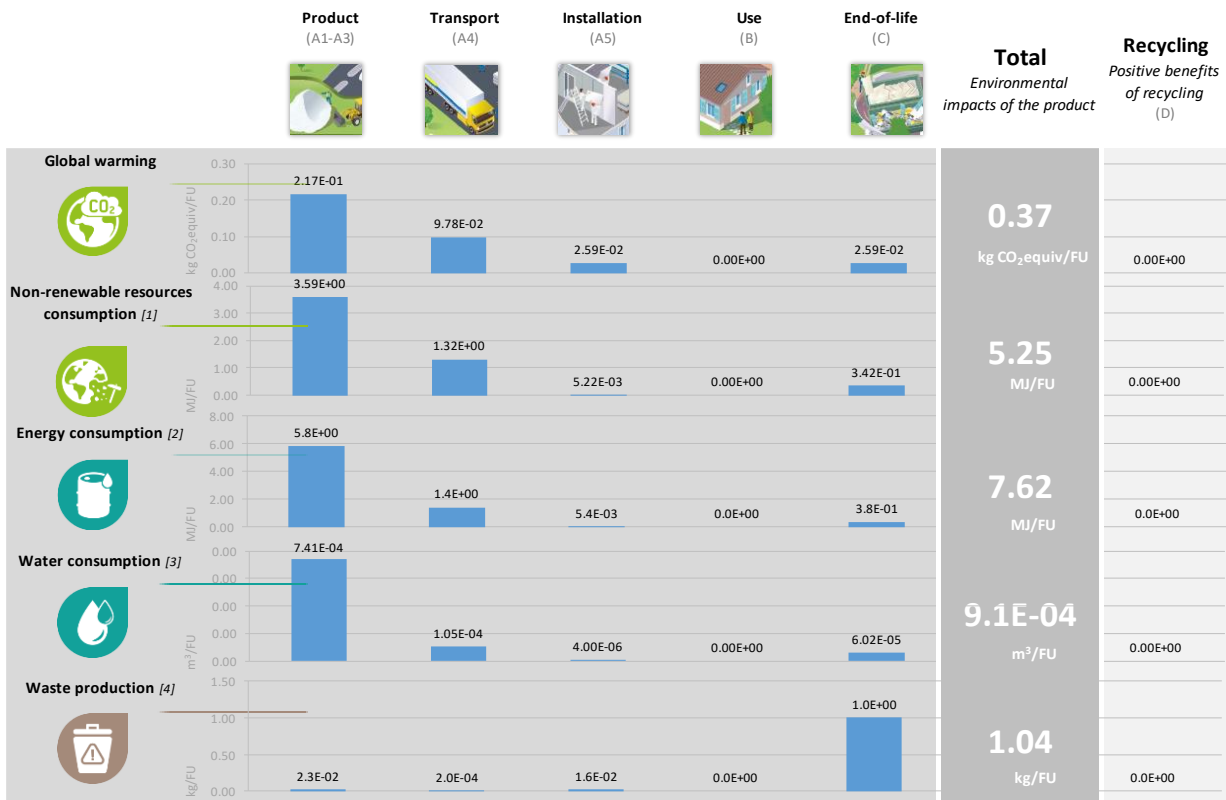
## Information on Biogenic Carbon Content

Biogenic Carbon Content		Crystacal White Fine
	Biogenic carbon content in product [kg]	0 kg C eq.
	Biogenic carbon content in packaging [kg]	5.73 E-03 kg C eq.

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO<sub>2</sub>.

The product contains no biogenic carbon content. However, packaging has some biogenic carbon content, this is due to wooden pallets used for the tertiary packaging.

## LCA Interpretation



[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.

## Climate Change (total)

The figure above breaks down the GWP of Crystacal White Fine into clear categories to understand the modules that cause the largest environmental impact. Most impact derives from Module A1-A3, contributing 59.2% to the overall Climate Change impact value. Further analysis showed that Module A3 contributes 0.129 kgCO<sub>2</sub>eq/kg (35.3% of the total), which derives mainly from the use of natural gas for process steam (~94% of A3). The main source of impact from the supply of raw materials (A1 & A2) is the supply of synthetic gypsum (~26% of the total). In A4 (which contributed 26.7% of the total), the model considered the product being distributed internationally only (based on 2022 data), requiring both diesel-operated HGVs and HFO-operated containerships. In addition, Module A5 generated a 7.07% impact, this can be attributed mainly to the release of biogenic carbon stored in packaging materials at their disposal.

## Non-renewable Resources Consumptions

The consumption of non-renewable resources has the highest value during the product stage (Module A1-A3) – 68.3%. For Alpha HH Base (synthetic), 40.1% of the total non-renewable resource consumption stems from Module A3. This can be attributed mainly to the use of natural gas to produce process steam. The second and third highest contributing modules are A4 (25.1% of the total) and A2 (21.95% of the total), where raw materials and the product are transported using diesel-operated HGVs and HFO-operated containerships. Synthetic gypsum used in the production is imported from Europe and the product is generally exported internationally. Otherwise, the production of raw materials (Module A1) and the product end-of-life processes (Module C), contributed little to the overall impact – 6.25% and 6.52%, respectively.

## 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 highest contributing modules are A1 (32.2%) and A3 (27.8%). This can be attributed to the energy requirements for producing synthetic gypsum and for processing the gypsum into the final product at the manufacturing site, respectively. Other modules that have a considerable contribution to the overall score are Modules A2 (16.3%) and A4 (18.6%) where fuel is required for importing raw materials and distributing the product internationally. All other modules (within Modules B and C) contribute <5% or less to the overall impact.

## Water Consumption

Water consumption is the use of freshwater throughout the product's life cycle. The highest contributor is the product stage (A1-A3) – 81.4%. The main sources of water consumption in Module A1-A3 lie with electricity generation (66.3% of the total) and the production of synthetic gypsum (30.5% of the total). All other modules contribute <5% or less to the overall impact. All other modules contribute <5% or less to the overall impact.

## Waste Production

Waste production includes all hazardous, non-hazardous and radioactive waste disposed of. Waste production doesn't follow the same trend as the other environmental impacts. For Alpha HH Base (synthetic) >99.5% of the waste generated is at Module C, where products are assumed landfilled at their end of life. While there is waste produced in other life cycle stages (namely process wastes in Modules A1 and A3, and packaging disposal in Module A5), per declared unit, it can be deemed minimal.

## Additional Information:

### Electricity Information

TYPE OF INFORMATION	DESCRIPTION
Electricity Purchaser	Saint-Gobain Construction Product UK Limited (incl. Saint-Gobain Formula)
Electricity Provider	Smartest Energy Ltd
Electricity Mix	Hydro – 30.8% Solar PV – 28.5% Wind – 40.7%
Reference year	2021-2022
Type of dataset	Sphera Database 2023.1, all datasets reference 2022 emissions <ul style="list-style-type: none"><li>- Hydro “GB: Electricity from hydro power Sphera”</li><li>- Solar PV “GB: Electricity from photovoltaic Sphera”</li><li>- Wind “GB: Electricity from wind power Sphera”</li></ul>
CO <sub>2</sub> emission kg CO <sub>2</sub> eq. / kWh	Certificate issue = 0 kgCO <sub>2</sub> /kWh Modelled impact = 0.029 kgCO <sub>2</sub> /kWh

### 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 records and reporting documents from Saint-Gobain Formula. 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 results of 1 kg of Crystacal White Fine.

Environmental impacts	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
Global Warming Potential (GWP) [kg CO <sub>2</sub> eq.]	2.11E-01	9.52E-02	2.43E-02	0	0	0	0	0	0	0	4.42E-03	6.62E-03	0	1.42E-02	0
Ozone depletion (ODP) [kg CFC 11eq.]	1.15E-09	1.48E-14	3.71E-11	0	0	0	0	0	0	0	6.38E-10	1.03E-15	0	4.50E-14	0
Acidification potential (AP) [kg SO <sub>2</sub> eq.]	2.75E-04	1.45E-04	1.33E-06	0	0	0	0	0	0	0	2.08E-05	9.61E-06	0	8.48E-05	0
Eutrophication potential (EP) [kg (PO <sub>4</sub> ) <sub>3</sub> -eq.]	7.77E-05	3.38E-05	4.29E-05	0	0	0	0	0	0	0	5.15E-06	2.22E-06	0	9.62E-06	0
Photochemical ozone creation (POCP) - [kg Ethylene eq.]	-1.60E-05	-3.62E-05	9.22E-07	0	0	0	0	0	0	0	2.72E-06	-2.26E-06	0	6.38E-06	0
Abiotic depletion potential for non-fossil resources (ADP-elements) [kg Sb eq.]	1.92E-07	6.38E-09	5.73E-10	0	0	0	0	0	0	0	1.75E-09	4.45E-10	0	7.07E-10	0
Abiotic depletion potential for fossil resources (ADP-fossil fuels) [MJ]	3.48E+00	1.30E+00	5.09E-03	0	0	0	0	0	0	0	4.98E-02	9.03E-02	0	1.92E-01	0

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