EGYPT Environmental Product Declarations EPD®

EPD® THE INTERNATIONAL EPD® SYSTEM

ECO PLATFORM EPD VERIFIED

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with EN 15804+A1 and ISO 14025

Gyplast Decor

Date of issue: 2022-02-23
Validity: 5 years
Valid until: 2027-02-22
Version: 1
Scope of the EPD®: Egypt

EPD VERIFIED

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.

Registration number
The International EPD® System:
S-P-05690

Gyproc SAINT-GOBAIN

1. General information

Manufacturer: SAINT-GOBAIN GYPROC EGYPT
Egyptian Gypsum Company Building #12b04, Cairo Festival City, second floor New Cairo • Egypt

Programme used: International EPD System **http://www.environdec.com/**

EPD registration number/declaration number: S-P-05690

PCR identification: The International EPD® System PCR 2012:01 version 2.34 for Construction Products. EN 15804 Sustainability of construction works.

Site of manufacture: The production site is SADAT CITY / BPB PLACO EGYPT

Owner of the declaration: SAINT-GOBAIN GYPROC EGYPT

UN CPC CODE: 37530

Product / product family name and manufacturer represented: Gyplast Decor
Declaration issued:2022-02-23 **Valid until**:2027-02-22

Demonstration of verification: An independent verification of the declaration was made, according to ISO 14025:2010. This verification was external and conducted by the following third party: Andrew Norton, Renuables, based on the PCR mentioned above.

EPD Prepared by: Yves Coquelet (Saint-Gobain LCA analyst) and El Sayed, Amr

Scope: The LCA is based on 2019 production data for one site in Egypt.
This EPD covers information modules A1 to C4 + module D (cradle to grave) as defined in EN 15804 +A1 :2012

Declared unit: 1kg of 25kg bagged Gyplast Decor applied to a depth of 10 mm
1m2 area of Gyplast Decor applied to a depth of 10mm would require 11.1kg of plaster.

Declaration of Hazardous substances: (Candidate list of Substances of Very High Concern): Not higher than 0.1% of the weight of the product.

CEN standard EN 15804 + A1 serves as the core PCR[a]	
PCR:	PCR 2012:01 Construction products and Construction services, Version 2.33
PCR review was conducted by:	The Technical Committee of the International EPD® System. Chair: Massimo Marino. Contact via info@environdec.com
Independent verification of the declaration, according to EN ISO 14025:2010 **Internal ☒ External ☒**	
Third party verifier:	Andrew Norton , Renuables **http://renuables.co.uk**
Accredited or approved by	The International EPD System

2. Product description

2.1 Product description and use:

"Gyplast Décor" is and advanced formula for site applied cornices, ready for manual application after the addition of the specific amount of water. It's mechanically mixed and automatically packed with constant tested ratios, composed from primary raw materials and high quality additives enhancing the product performance. Natural elements compose 95% of the total weight. After adding the right portion of clean water, it gives a homogeneous mortar ready for application without any further additives.

Facts and Info:
https://www.gyproc.com.eg/products/walls-ceilings-plastering/gyplast-decor

2.2 Base materials/Ancillary materials

Description of the main components and/or materials for 1 kg of product for the calculation of the EPD®:

PARAMETER	PART
GYPSUM and MINERALS	>99 %
ADDITIVES	< 1 %
TOTAL	**100%**
PACKAGING: BAGS	Bags are made of paper only

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

3. LCA calculation information

	EPD TYPE DECLARED	Cradle to Grave
3.1	DECLARED UNIT	The declared unit is 1 kg Gyplast Decor
3.2	SYSTEM BOUNDARIES	Cradle to Gate: stages A1 – 3, A4 – A5, B1 – 7, C1 – 4 and Module D
3.3	ESTIMATES AND ASSUMPTIONS	Primary data was gathered from one production site in Egypt. The distance to a waste disposal site is assumed to be 50km.
3.4	CUT-OFF CRITERIA	Life Cycle Inventory data for a minimum of 99% of total inflows to the upstream and core module shall be included.
3.5	BACKGROUND DATA	All primary product data was provided by Saint-Gobain Gyproc Egypt. All secondary data was retrieved using Gabi LCA software using Ecoinvent 3.6 (July 2018) and the Thinkstep Construction Products databases.
3.6	DATA QUALITY	Primary data was gathered from Gyproc Egypt production figures from one site in Egypt during the production period 2019. A 2019 fuel mix for electricity usage in Egypt was assumed for the production sites.
3.7	PERIOD UNDER REVIEW	The data is representative of the manufacturing processes of 2019.
3.8	ALLOCATIONS	All production, recycling, energy and waste data has been calculated on a mass basis.
3.9	COMPARABILITY	EPD of construction products may not be comparable if they do not comply with EN15804+ A1.

4. Life cycle stages

Flow diagram of the Life Cycle

Product stage, A1-A3

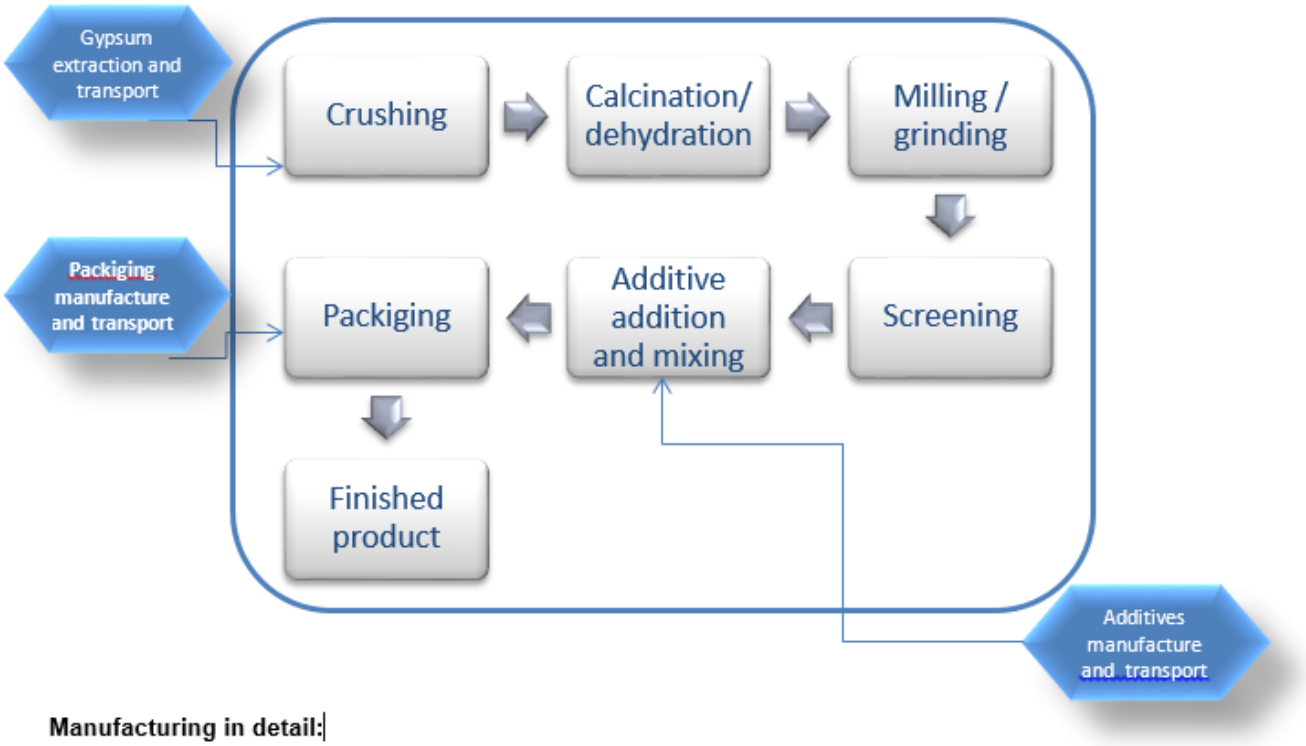
Description of the stage: the product stage of plasterboard products is subdivided into three modules A1, A2 and A3 respectively “raw material supply”, “transport to manufacturer” and “manufacturing”.

A1, raw material supply
This includes the extraction and processing of all raw materials and energy which occur upstream from the 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 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.

Manufacturing process flow diagram



Manufacturing in detail:

Gypsum rock is open pit quarried by drilling and blasting, then transported to a crushing plant where it is crushed, screened and stockpiled according to its quality. The stockpiled ore transported by trucks to manufacturing factory is first crushed to reduce rocks size and further dehydrated in calcining kilns to produce hemihydrate (stucco). Stucco is further ground to obtain a specific surface area and then screened to remove any particles that are too large. In the manufacture of plasters, stucco is batch mixed with additives and aggregates to produce finished product. The thoroughly mixed plaster is fed to a bagging operation.
Gypsum waste is reintegrated back into the manufacturing process wherever possible.

Construction process stage, A4-A5

Description of the 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

This module includes transport from the production gate to the building site. Transport is calculated on the basis of a scenario with the parameters described in the following table. The distance quoted is a weighted average from the production site to the building site, calculated using post codes of our customers and quantity of product travelled.

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	Truck: 234 km
Capacity utilisation (including empty returns)	100% Capacity (89% empty returns)
Bulk density of transported products	827 kg/m^3
Volume capacity utilisation factor	1

A5, installation into the building

The accompanying table quantifies the parameters for installing the product at the building site. All installation materials and their waste processing are included.

PARAMETER	VALUE (expressed per functional/declared unit)
Ancillary materials for installation (specified by materials)	Non
Water use	0.6 litres/kg
Other resource use	None
Quantitative description of energy type (regional mix) and consumption during the installation process	None
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	Plaster: 0,05 kg (5%)
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)	0,051 kg Gyplast Decor to landfill Packaging: Bags : 4 g paper to Landfill
Direct emissions to ambient air, soil and water	None

Use stage (excluding potential savings), B1-B7

Description of the stage:
The use stage, related to the building fabric includes:

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. Therefore, it has no impact at this stage.

End-of-life stage C1-C4

Description of the stage: This stage includes the next modules:

C1, de-construction, demolition;
C2, transport to waste processing;
C3, waste processing for reuse, recovery and/or recycling;
C4, disposal, including provision and all transport, provision of all materials, products and related energy and water use.

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

PARAMETER	VALUE (expressed per functional/declared unit)
Collection process specified by type	1.186 kg collected with mixed de-construction and demolition waste to landfill
Disposal specified by type	1.186 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 20 km from construction/demolition site to waste handler

Reuse/recovery/recycling potential, D

Description of the stage: As the product is 100% considered as landfill there is no benefits or impacts in this stage.

5. LCA results

Description of the system boundary (X = Included in LCA).

CML 2001 has been used as the impact model. Specific data has been supplied by the plant, and generic data comes from GABI and Ecoinvent databases.
All emissions to air, water, and soil, and all materials and energy used have been included.

All figures refer to a declared unit of 1 kg installed plaster and with a specified function and an expected average service life of 60 years.

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	X

ENVIRONMENTAL IMPACTS

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 100) - *kg CO_2 equiv./FU*	4,73E-01	1,20E-02	2,47E-02	0	0	0	0	0	0	0	5,14E-03	1,11E-03	0	1,73E-02	0
	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) *kg CFC 11 equiv./FU*	9,35E-09	2,39E-18	4,67E-10	0	0	0	0	0	0	0	7,38E-19	2,76E-19	0	8,83E-17	0
	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) *kg SO_2 equiv./FU*	1,54E-03	4,76E-05	8,25E-05	0	0	0	0	0	0	0	1,27E-05	4,47E-06	0	1,02E-04	0
	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) *kg $(PO_4)^{3-}$ equiv./FU*	7,32E-04	1,17E-05	3,74E-05	0	0	0	0	0	0	0	1,01E-06	1,12E-06	0	1,15E-05	0
	Excessive enrichment of waters and continental surfaces with nutrients, and the associated adverse biological effects.														
Photochemical ozone creation (POPC) *kg Ethylene equiv./FU*	1,37E-05	1,64E-06	3,23E-06	0	0	0	0	0	0	0	9,79E-07	1,79E-07	0	8,32E-06	0
	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 ressources (ADP-elements) - *kg Sb equiv./FU*	1,23E-07	1,50E-10	6,48E-09	0	0	0	0	0	0	0	1,40E-10	1,01E-10	0	6,07E-09	0
Abiotic depletion potential for fossil ressources (ADP-fossil fuels) - *MJ/FU*	5,85E+00	1,68E-01	3,06E-01	0	0	0	0	0	0	0	6,35E-02	1,50E-02	0	2,25E-01	0
	Consumption of non-renewable resources, thereby lowering their availability for future generations.														

RESSOURCE USE

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	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste	C4 Disposal	
Use of renewable primary energy excluding renewable primary energy resources used as raw materials *MJ/FU*	3,33E-01	4,07E-03	2,10E-02	0	0	0	0	0	0	0	2,22E-04	8,69E-04	0	3,04E-02	0
Use of renewable primary energy used as raw materials *MJ/FU*	5,29E-02	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU*	3,86E-01	4,07E-03	2,10E-02	0	0	0	0	0	0	0	2,22E-04	8,69E-04	0	3,04E-02	0
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU*	8,14E+00	1,68E-01	4,21E-01	0	0	0	0	0	0	0	6,36E-02	1,51E-02	0	2,32E-01	0
Use of non-renewable primary energy used as raw materials - *MJ/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU*	8,14E+00	1,68E-01	4,21E-01	0	0	0	0	0	0	0	6,36E-02	1,51E-02	0	2,32E-01	0
Use of secondary material - *kg/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of renewable secondary fuels - *MJ/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of non-renewable secondary fuels - *MJ/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of net fresh water - *m³/FU*	2,58E-02	7,39E-07	1,46E-03	0	0	0	0	0	0	0	3,95E-07	1,01E-06	0	5,84E-05	0

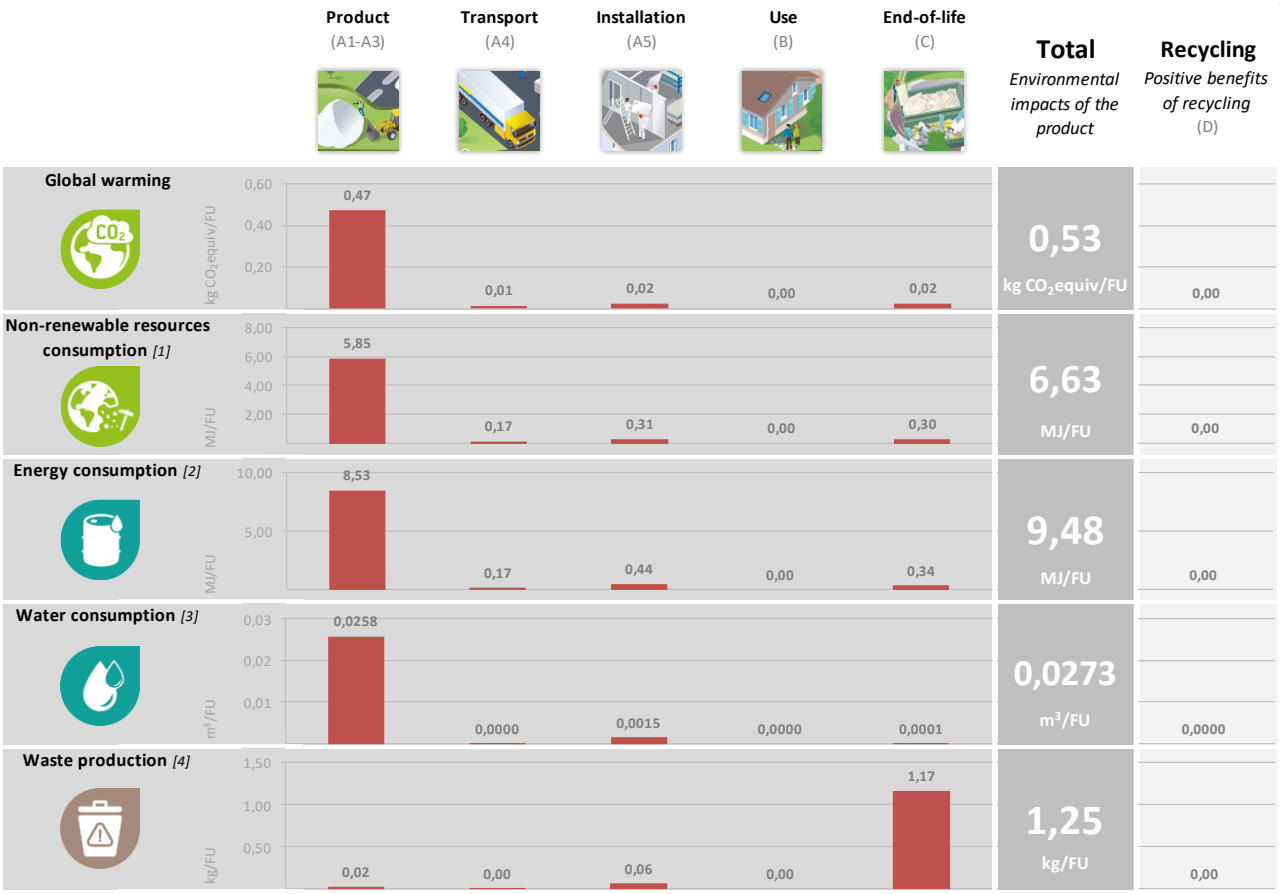
WASTE CATEGORIES															
Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	
Hazardous waste disposed *kg/FU*	1,20E-09	1,08E-11	3,24E-10	0	0	0	0	0	0	0	6,45E-12	6,98E-10	0	3,54E-09	0
Non-hazardous (excluding inert) waste disposed *kg/FU*	2,29E-02	3,41E-06	5,95E-02	0	0	0	0	0	0	0	1,57E-05	2,39E-06	0	1,17E+00	0
Radioactive waste disposed *kg/FU*	8,70E-05	1,91E-07	4,50E-06	0	0	0	0	0	0	0	7,30E-08	2,78E-08	0	2,60E-06	0

OUTPUT FLOWS

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	
Components for re-use *kg/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling *kg/FU*	5,95E-06	0	4,00E-03	0	0	0	0	0	0	0	0	0	0	0	0
Materials for energy recovery *kg/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy, detailed by energy carrier *MJ/FU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

6. LCA results interpretation

The following figure refers to a declared unit of 1kg installed plaster and with a specified function and an expected average service life of 60 years.



[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.

Global Warming Potential (Climate Change) (GWP)

When analysing the above figure for GWP, it can clearly be seen that the majority (approximately 80%) of contribution to this environmental impact is from the production modules (A1 – A3). CO_2 is released on site by the combustion of natural gas. Installation (A5) will generate the second highest percentage of greenhouse gas emissions primarily due to the use of jointing materials at this stage.

Non-renewable resources consumptions

We can see for consumption of non – renewable resources that the majority of contribution to this environmental impact is from the production modules (A1 – A3). This is because a large quantity of natural gas is consumed within the factory. The contribution to this impact from the other modules is very small and primarily due to the non – renewable resources consumed during installation (A5).

Energy Consumptions

As we can see, modules A1 – A3 have the highest contribution to total energy consumption. Energy in the form of electricity and natural gas is consumed in a vast quantity during the manufacture of plasterboard so we would expect the production modules to contribute the most to this impact category.

Water Consumption
Water is used within the manufacturing facility and therefore we see the highest contribution in the production phase. However, SAINT-GOBAIN GYPROC EGYPT production methods maximise the use of recovered water, such as mine-water and leachate. Water abstracted from boreholes and reservoirs is also utilised so that water withdrawn from the public network is relatively low. The second highest contribution occurs in the installation site due to the water used in the jointing components.

Waste Production
Waste production does not follow the same trend as the above environmental impacts. The largest contributor is the end of life module. This is because the 100% of the product is assumed to be sent to landfill once it reaches the end of life state. The very small impact associated with installation is due to the loss rate of product during implementation.

7. References

PCR
The International EPD® System PCR 2012:01 version 2.34 for Construction Products and CPC 54 construction services.

1. EPD International (2017) General Programme Instructions for the International EPD® System. Version 3.0, dated 2017-12-11. www.environdec.com.
2. EN 15804:2012+A1:2013 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
3. ISO 21930:2007 Sustainability in building construction – Environmental declaration of building products
4. ISO 14025:2011-10 Environmental labels and declarations – Type III environmental declarations – Principles and procedures
5. European Chemical Agency, Candidate List of substances of very high concern for Authorisation. http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp