ENVIRONMENTAL PRODUCT DECLARATION

In accordance with EN 15804 and ISO 14025

Gyproc Wetroom 12.5mm

Date of issue:30/09/2019
Validity: 5 years
Valid until:30/09/2024
Scope of the EPD®: Belgium

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.

N° VERIFICATION

20190131-DML_RST_GYPROC

Gyproc
SAINT-GOBAIN

General information

Manufacturer:
Saint-Gobain Construction Products Belgium, Division Gyproc, Sint-Jansweg 9, Haven 1602, B-9130, Belgium

Programme used:
Belgian EPD program B-EPD

EPD registration number/declaration number: --

PCR identification:
NBN EN 15804+A1 and NBN DTD B 08-001:2017

Product / product family name and manufacturer represented:
Gyproc Wetroom board 12.5mm manufactured at Kallo, Belgium

Declaration issued: 30st September 2019
Valid until: 30st September 2024

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:
Evert VERMAUT, based on the PCR mentioned above.

EPD Prepared by: LCA Central TEAM, Saint Gobain

Scope: This EPD is representative for the Belgian Market

CEN standard EN 15804 serves as the core PCR[a]
Independent verification of the declaration, according to EN ISO 14025:2010 ☐ **Internal** ☒ **External**
Third party verifier[b]: **Evert VERMAUT** **Team leader & Consultancy Manager** **M: +32 479 51 20 83** **E: Evermaut@vincotte.be** **Jan Olieslagerslaan 35 - 1800 Vilvoorde - Belgium**
[a] Product Category Rules **[b] Optional for business-to-business communication; mandatory for business to consumer communication (see EN ISO 14025:2010, 9.4)**

Product description

Product description and use:

Gyproc WR 12,5 mm is a 12.5 mm thick plasterboard for interior building applications. Gyproc WR was specifically developed for high performance under humid conditions. The tapered edge allows the use of joint filler to produce a durable joint reinforcement and a smooth, continuous, crack-resistant surface ready for priming and final decoration. The smooth surface of the paper lining is an ideal base for decoration by painting for example.

Description of the main product components and or materials:

Plasterboard is made up of a gypsum core (calcium sulfate hydrate) with additive and a paper liner. Small quantities of chopped glass fiber, micro silica and vermiculite may be added with starch, foam and dispersants.

Description of the main components and/or materials for 1 m2 of product for the calculation of the EPD®:

PARAMETER	VALUE
Quantity of plaster for 1 m^2 of product	10,3 Kg
Thickness	12,5 mm
Density	824 kg/m^3
Surfacing	Paper 360 g/m^2
Packaging for the transportation and distribution	Wooden pallet : 292 g / m^2 (120 m^2 / pallet)
Product used for the Installation	Paper tape, jointing compound, screws

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 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.

LCA calculation information

DECLARED UNIT	$1m^2$ of installed board.
SYSTEM BOUNDARIES	Cradle to gate with options : stages included A1–3, A4-5, B1–7, C1–4 and D
REFERENCE SERVICE LIFE (RSL)	50 years Considered as a standard building design life - As there are no impacts associated with the use stage, the RSL is not thought to have an impact on the environmental performance of the product.
CUT-OFF RULES	Life Cycle Inventory data for a minimum of 99% of total inflows to the upstream and core module shall be included
ALLOCATIONS	Production data. Recycling, energy and waste data has been calculated on a mass basis.
GEOGRAPHICAL COVERAGE AND TIME PERIOD	Scope includes Data included is collected from one production site, Kallo. Data Collected for the year 2017 Background data: Ecoinvent (2015) and Gabi (2013 - 2016)

According to EN 15804, EPD's of construction products may not be comparable if they do not comply with this standard.

Life cycle stages

Flow diagram of the Life Cycle

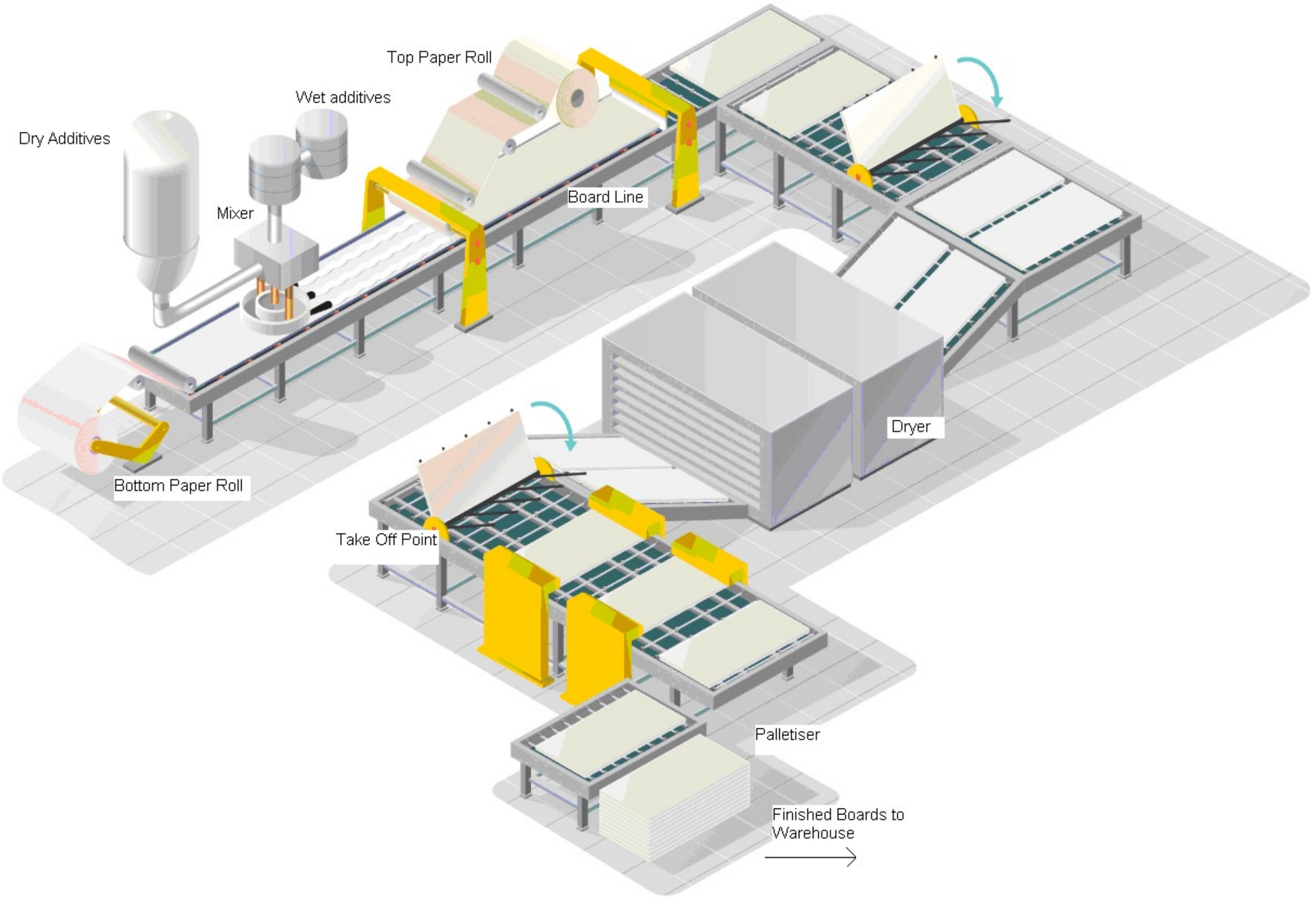
Product stage, A1-A3

Description of the stage:
A1, raw material extraction and processing, processing of secondary material input (e.g. recycling processes), 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, including provision of all materials, products and energy, as well as waste processing up to the end-of waste state or disposal of final residues during the product stage. 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



Manufacture:
The initial materials are homogenously mixed to form a gypsum slurry that is spread via multiple hose outlets onto a paper liner on a moving conveyor belt. A second paper liner is fed onto the production line from above to form the plasterboard. The plasterboard continues along the production line where it is finished, dried, and cut to size.

Recycled Gypsum waste is reintegrated back into the manufacturing process wherever possible.

Construction process stage, A4-A5

Description of the stage:
A4, transport to the building site;
The default scenario from NBN DTD B 08-001:2017 is applied

A5, installation into the building; including provision of all materials, products and energy, as well as waste processing up to the end-of-waste state or disposal of final residues during the construction process stage. These information modules also include all impacts and aspects related to any losses during this construction process stage (i.e. production, transport, and waste processing and disposal of the lost products and materials).

Transport to the building site:

	ORGANISATION OF TRANSPORT		Factory to construction site with Lorry EURO5	Factory to supplier	Supplier to construction site	
	% directly from factory to construction site	% via intermediary supplier	Lorry EURO5 16-32 ton	Lorry EURO5 >32ton	Lorry EURO5 16-32 ton	Lorry EURO5 7.5-16 ton
Loose products (e.g. blocks, bricks, roof tiles, plasterboard	40%	60%	100%	100%	85%	15%
Distance in km	100	135	100	100	35	35

Installation in the building:

PARAMETER	VALUE (expressed per functional/declared unit)
Ancillary materials for installation (specified by materials)	Jointing compound 0.24kg/m2 board, tape 1.23m / m2 board, screws 8 / m2 board
Water use	0.105 litres/m2 board
Other resource use	None
Quantitative description of energy type (regional mix) and consumption during the installation process	None required
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	0.515 (kg) scrap plasterboard, and 0.012 (kg) scrap Jointing Compound
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)	12.5mm Wetroom Board: 0.4635 kg to recycling 12.5mm Wetroom Board: 0.0515 kg to landfill Jointing Compound: 0.0108 kg to recycling Jointing Compound: 0.0012 kg 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 50 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 theses stages.

End-of-life stage C1-C4

Description of the stage: The end-of-life stage includes:
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.

End-of-life:

PARAMETER	VALUE (expressed per functional/declared unit) / DESCRIPTION
Collection process specified by type	Approximately 60% of Gypsum waste is collected in Belgium with mixed construction and demolition waste. 30% is collected separately for recycling into Gypsum products, and the remaining 10% is landfilled.
Recovery system specified by type	Belgium: 90% Recycled Energy use for waste treatment: 0,035 MJ of electricity /kg of recycled gypsum 0.008 MJ of Fuel /kg of recycled gypsum
Disposal specified by type	Belgium: 10% Landfill
Assumptions for scenario development (e.g. transportation)	On Average Gypsum waste is transported 50km by road from construction / demolition sites to end of life treatment or disposal.

Reuse/recovery/recycling potential, D

Description of the stage:
Module D includes:
D, reuse, recovery and/or recycling potentials, expressed as net impacts and benefits.

LCA results

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	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)* - *kg CO_2 equiv/FU*	2,62E+00	1,61E-01	1,68E-01	0	0	0	0	0	0	0	4,68E-02	3,22E-03	3,48E-02	1,67E-02	-4,11E-02
	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*	1,02E-07	3,00E-08	5,12E-09	0	0	0	0	0	0	0	6,37E-18	1,96E-11	6,90E-09	9,31E-17	-4,00E-13
	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*	4,68E-03	5,28E-04	3,31E-04	0	0	0	0	0	0	0	1,64E-04	1,65E-05	7,23E-05	9,51E-05	-2,26E-07
	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*	4,46E-03	1,66E-04	2,36E-04	0	0	0	0	0	0	0	9,56E-06	3,57E-06	1,25E-05	1,08E-05	5,58E-06
	Excessive enrichment of waters and continental surfaces with nutrients, and the associated adverse biological effects.														
Photochemical ozone creation (POPC) *kg Ethene equiv/FU*	1,87E-04	4,36E-05	4,69E-05	0	0	0	0	0	0	0	1,10E-05	7,38E-07	5,59E-06	7,83E-06	9,51E-06
	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*	3,92E-06	4,33E-07	2,08E-06	0	0	0	0	0	0	0	1,16E-09	2,49E-10	8,44E-09	5,67E-09	4,98E-09
Abiotic depletion potential for fossil ressources (ADP-fossil fuels) - *MJ/FU*	4,30E+01	2,49E+00	2,50E+00	0	0	0	0	0	0	0	5,83E-01	4,37E-02	4,60E-01	2,22E-01	-5,87E-01
	Consumption of non-renewable resources, thereby lowering their availability for future generations.														

***As there is no evidence that Biogenic Carbon comes from sustainably managed sources Biogenic Carbon is accounted as 0 kg eqCO2 in GWP.**

RESOURCE 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 energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	
Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/FU*	1,77E+01	2,69E-02	1,41E+00	0	0	0	0	0	0	0	1,89E-03	2,31E-03	3,49E-02	2,92E-02	1,18E+00
Use of renewable primary energy used as raw materials *MJ/FU*	5,19E+00	2,53E+00	2,70E+00	0	0	0	0	0	0	0	5,85E-01	4,57E-02	1,12E+00	2,30E-01	-5,90E-01
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU*	2,29E+01	2,69E-02	1,41E+00	0	0	0	0	0	0	0	1,89E-03	2,31E-03	3,49E-02	2,92E-02	1,18E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU*	4,63E+01	2,53E+00	2,72E+00	0	0	0	0	0	0	0	5,85E-01	4,57E-02	1,12E+00	2,30E-01	-5,90E-01
Use of non-renewable primary energy used as raw materials - *MJ/FU*	4,63E-01	0	2,70E-02	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*	4,67E+01	2,53E+00	2,72E+00	0	0	0	0	0	0	0	5,85E-01	4,57E-02	1,12E+00	2,30E-01	-5,90E-01
Use of secondary material - *kg/FU*	5,08E-01	0	2,70E-02	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 - *m^3/FU*	1,59E-02	4,71E-04	9,60E-04	0	0	0	0	0	0	0	3,48E-06	4,12E-06	2,11E-04	5,78E-05	-4,39E-04

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*	2,27E-05	4,88E-11	1,14E-06	0	0	0	0	0	0	0	7,20E-11	1,95E-09	3,81E-11	3,92E-09	-2,79E-09
Non-hazardous (excluding inert) waste disposed *kg/FU*	-1,11E-01	1,65E-07	4,84E-02	0	0	0	0	0	0	0	8,60E-05	3,01E-06	1,36E-05	1,07E+00	-4,21E-01
Radioactive waste disposed *kg/FU*	1,53E-04	1,59E-08	2,07E-05	0	0	0	0	0	0	0	7,21E-07	8,04E-08	1,83E-07	3,05E-06	-1,36E-06

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*	2,43E-02	0	7,63E-01	0	0	0	0	0	0	0	0	0	9,59E+00	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

ADDITIONAL 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	
Ecotoxicity - freshwater [CTUe]	3,71E-01	3,74E-01	2,28E-02	0	0	0	0	0	0	0	1,18E-02	4,30E-04	4,73E-03	1,84E-03	-3,68E-03
Human toxicity - cancer effects [CTUh]	5,27E-09	9,72E-10	3,12E-10	0	0	0	0	0	0	0	2,71E-10	1,77E-11	1,23E-10	1,69E-10	-1,30E-10
Human toxicity - non-cancer effects [CTUh]	6,88E-08	2,20E-08	5,24E-09	0	0	0	0	0	0	0	1,15E-09	1,88E-10	9,22E-10	1,23E-08	-1,09E-08
Particulate matter [kg PM2.5 eq.]	4,03E-04	4,41E-05	2,54E-05	0	0	0	0	0	0	0	1,02E-05	9,38E-07	5,95E-06	7,38E-06	-2,36E-05
Water resource depletion [m³ eq.]	1,92E-02	3,01E-04	1,71E-03	0	0	0	0	0	0	0	1,88E-05	6,39E-06	1,03E-03	2,83E-04	2,98E-04
Ionizing radiation - human health effects [kBq U235 eq.]	1,58E-01	1,07E-02	9,41E-03	0	0	0	0	0	0	0	1,05E-04	4,51E-05	1,18E-02	3,24E-04	-2,87E-04
Land use: transformation - SOM [kg C deficit eq.]	4,68E-01	4,91E-01	2,74E-02	0	0	0	0	0	0	0	-8,93E-04	1,64E-05	6,60E-03	8,25E-05	7,50E-02
Land use: occupation - SOM [kg C deficit eq.]	5,47E+00	1,64E-01	3,59E-01	0	0	0	0	0	0	0	1,91E-04	1,62E-03	8,40E-03	5,39E-03	7,13E-01
Land use: transform. - biodiversity, ALL [PDF*m²]	1,79E-04	7,13E-05	8,96E-06	0	0	0	0	0	0	0	0	1,95E-08	6,86E-06	8,10E-26	-2,38E-14
Land use: transf. - flows biodiv., agric [m²]	1,97E-06	1,59E-06	9,84E-08	0	0	0	0	0	0	0	0	1,30E-10	4,56E-08	0	0
Land use: transf. - flows biodiv., urban [m²]	4,43E-06	6,77E-07	2,22E-07	0	0	0	0	0	0	0	0	5,99E-10	2,10E-07	3,22E-27	-9,46E-16

LCA results 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.

Global Warming Potential (Climate Change) (GWP)

When analyzing the above figure for GWP, it can clearly be seen that the majority of contribution to this environmental impact is from the production modules (A1 – A3). This is primarily because the sources of greenhouse gas emissions are predominant in this part of the life cycle. CO2 is generated upstream from the production of electricity and is also released on site by the combustion of natural gas. We can see that other sections of the life cycle also contribute to the GWP; however, the production modules contribute to over 80% of the contribution. Combustion of fuel in transport vehicles will generate the second highest percentage of greenhouse gas emissions.

Non-renewable resources consumptions

We can see that the consumption of non – renewable resources is once more found to have the highest value in the production modules. This is because a large quantity of natural gas is consumed within the factory, and non – renewable fuels such as natural gas and coal are used to generate the large amount of electricity we use. The contribution to this impact from the other modules is very small and primarily due to the non – renewable resources consumed during transportation.

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 glass wool so we would expect the production modules to contribute the most to this impact category.

Water Consumption
We can see that water consumption is mainly during the production phase. For the production phase, water is used within the manufacturing facility and therefore we see the highest contribution here. However, we recycle a lot of the water on site so the contribution is still relatively low.

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 a part of the product is sent to landfill once it reaches the end of life state. However, there is a still an impact associated with the production module since we do generate waste on site. The very small impact associated with installation is due to the loss rate of product during implementation.

Additional information on indoor air quality

No test has been carry out on plasterboard from Kallo factory.
Test on air quality has been carry out on French plasterboard from Saint-Gobain factories with similar composition according EN13419-1; EN13419-3 and lead to a total emission of VOC < 1000 µg/m³.

References:

1. NBN EN 15804+A1:2014 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
2. NBN/DTD B 08-001 :2017
3. ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures
4. ISO 14040:2006 Environmental management. Life cycle assessment. Principles and framework
5. ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines
6. http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp