

ENVIRONMENTAL PRODUCT DECLARATION

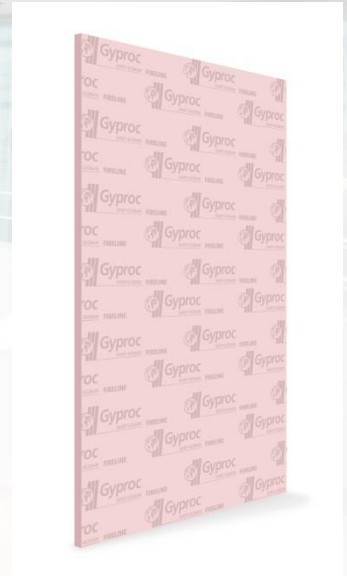
In accordance with EN 15804 and ISO 14025

12.5mm Gyproc FireLine Board

Date: May 2014
Version : 1



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.



 **EPD**[®]
THE INTERNATIONAL EPD[®] SYSTEM

 **Gyproc**
SAINT-GOBAIN

General information

Manufacturer: Gypsum Industries Ltd, Unit 4, Kilcarberry Business Park, Nangor Road, Dublin 22

Programme used: International EPD system

EPD registration number /declaration number: **S-P-00583**

PCR identification: The International EPD System Product Category Rules and PCR Basic Module. Construction Products and Construction Services. Version 1.0. 2012.

Product / product family name and manufacturer represented: FireLine 12.5mm Plasterboard manufactured by Gypsum Industries Ltd at Kingscourt Plant.

Declaration issued: 7th July 2014

Valid until: 7th July 2019

Demonstration of verification: an independent verification of the declaration was made, according to ISO 14025:2010. And EN15804. This verification was external and conducted by the following third party: Dr Andrew Norton, Renuables, based on the PCR mentioned above.

Owner of the declaration: Gypsum Industries Ltd, Unit 4, Kilcarberry Business Park, Nangor Road, Dublin 22

EPD Prepared by: Central SHEAR, Saint Gobain Gypsum.

Contact. acagen-epd.gypsum@saint-gobain.com

Scope: The EPD is based on 2012 production data for the Kingscourt site producing 12.5mm Fireline plasterboard. This EPD covers information modules A1 to C4 (cradle to grave) as defined in EN 15804:2012

The declared unit is 1m2 of 12.5mm thick FireLine plasterboard with a density of 880 kg/m3.

Substances of Very High Concern:

Cas number	Description
160901-28-0	Alcohols, C9-11, branched and linear, ethoxylated (1-2.5 EO), sulfates, sodium salts

Target Group; Business to Business

CEN standard EN 15804 serves as the core PCR^a
Independent verification of the declaration, according to EN ISO 14025:2010 <input type="checkbox"/> Internal <input checked="" type="checkbox"/> External
Third party verifier^b : Dr Andrew Norton, Renuables
^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 FireLine consists of an aerated gypsum core with glass fibre and other additives encased in, and firmly bonded to, strong paper liners. The gypsum core contains various additives. Gyproc FireLine comes with the option of either tapered edge or square edge on the long edges and has short edges sawn straight. Gyproc FireLine is a plasterboard that is suitable for dry lining internal surfaces.

Description of the main product components and or materials:

Plasterboard is made up of a gypsum core mixed with additive and encased in a paper liner. No additives used are classed as substance of concern; substances are not listed specifically to protect proprietary information.

Application:

Gyproc plasterboards can be used to partition any interior and are the preferred choice of construction for a range of applications, in homes, hotels, hospitals, schools, theatres, and industry. They are strong and robust and can typically last the lifetime of a building unless they are subjected to abuse or alteration.

Reference service life (RSL)

Plasterboard is expected to last the service life of a building. In accordance with the Saint-Gobain Methodological Guide for Construction Products, the Reference Service Life (RSL) is 50 years. RSL is dependent on the properties of the product and reference in use conditions. The RSL applies for the reference conditions only.

LCA calculation information

DECLARED UNIT	1m ² of installed board weighing 10. kg
SYSTEM BOUNDARIES	Cradle to Grave: Mandatory stages A1 – 3, B1 – 7, C1 – 4 and Optional Stage = D
REFERENCE SERVICE LIFE (RSL)	50 years
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 have been calculated on a mass basis.
GEOGRAPHICAL COVERAGE AND TIME PERIOD	The Republic of Ireland and Northern Ireland

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

The scenarios included are currently in use and are representative for one of the most likely scenario alternatives

All primary product data was provided by Gypsum Industries Ltd (2012). All secondary data was retrieved using TEAM with Ecoinvent 2.2 (2010) and DEAM (2010) databases.

Technical data:

Fireline 12.5mm plasterboard conforms to IS EN 520 2004 + A1-2009, Gypsum Plaster Boards Definitions Requirements and test methods. Gyproc 12.5 mm wallboard achieved a fire classification of A2-s1,d0

NOMINAL DENSITY	The assumed density is 886kg/m ³ (10.4kg/m ²) of 12.5mm Gyproc wall board
THERMAL CONDUCTIVITY	0..24 W/Mk
CLASS OF REACTION TO FIRE PERFORMANCE	A2-s1,d0

Certifications:

ISO 9001:2008 Quality Management System
 ISO 14001:2004 Environmental Management System
 BS OH SAS 18001:2007 Occupational Health and Safety Management

Life cycle stages

Flow diagram of the Life Cycle



Product stage, A1-A3

Description of the stage:

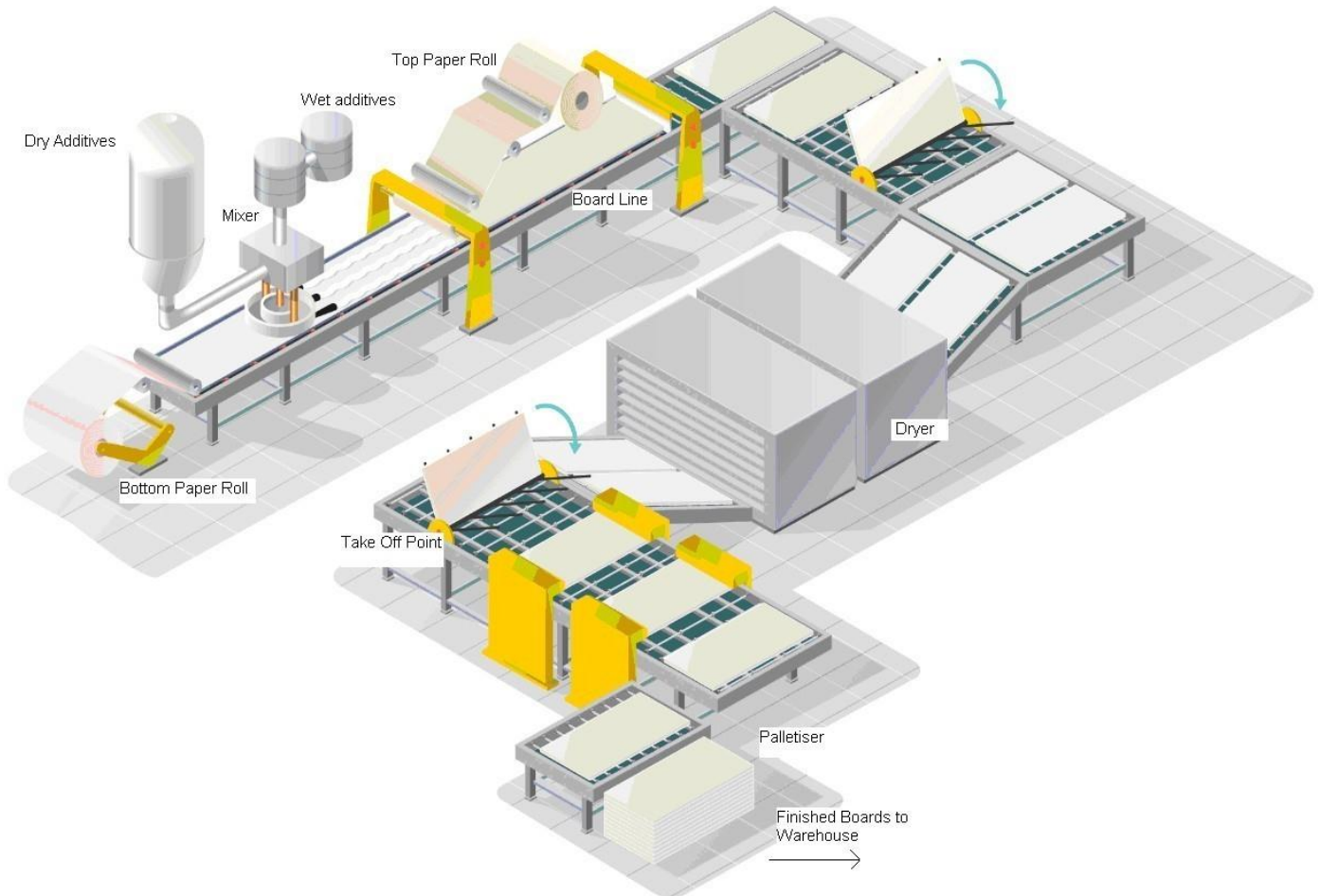
A1, raw material extraction and processing, processing of secondary material input (e.g. recycling processes). This includes the extraction and processing of all raw materials and energy which occur upstream from the manufacturing process.

A2, transport to the manufacturer. The raw materials are transported to the manufacturing site. The modeling 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 homogeneously 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;

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:

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.	0.38 litres per km
Distance	116 (km)
Capacity utilisation (including empty returns)	100% Volume Capacity 30% Empty Return
Bulk density of transported products	880 (kg/m ³)
Volume capacity utilisation factor	1

Installation in the building:

PARAMETER	VALUE (expressed per functional/declared unit)
Ancillary materials for installation (specified by materials)	Jointing compound 0.33kg/m ² board, tape 1.23m / m ² board, screws 8 / m ² board
Water use	0.165 litres/ m ² 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)	Board: 0.535 kg Screws: 0 kg Jointing Compound: 0.035 kg Jointing Tape: 0.000063 kg Pallet: 0.12 kg
Output materials (specified by type) as results of waste processing at the building site e.g. of collection for recycling, for energy recovering, disposal (specified by route)	12.5mm FireLine board : 0.749 kg to recycling, 3.21 kg for recycling. Screws: 0 kg Jointing Compound: 0.035 kg to recycling Jointing Tape: 0.000063 kg to landfill Pallet: 0.12 kg to recycling
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, including provision and transport of all materials, products and related energy and water use, as well as waste processing up to the end-of-waste state or disposal of final residues during this part of the use stage. These information modules also include all impacts and aspects related to the losses during this part of the use stage (i.e. production, transport, and waste processing and disposal of the lost products and materials).

Maintenance, Repair, Replacement, Refurbishment, Use of energy and water:

No Inputs are required at the above stages, and have therefore not been modeled.

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	70% collected separately for recycling. 30% collected with mixed construction and demolition waste for landfill.
Recovery system specified by type	70% recycled
Disposal specified by type	30% landfilled
Assumptions for scenario development (e.g. transportation)	On average, Gypsum waste is transported 32 km 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: 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	MND




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	
Global Warming Potential (GWP) - <i>kg CO₂ equiv/FU per 100 years.</i>	3.3E+00	7.3E-02	2.1E-01	0	0	0	0	0	0	0	0	8.5E-03	0	0	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) <i>kg CFC 11 equiv/FU</i>	2.0E-07	5.1E-08	2.9E-08	0	0	0	0	0	0	0	0	5.9E-09	0	0	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) <i>kg SO₂ equiv/FU</i>	2.0E-02	4.4E-04	9.4E-04	0	0	0	0	0	0	0	0	5.1E-05	0	0	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) <i>kg (PO₄)³⁻ equiv/FU</i>	1.3E-03	1.1E-04	1.7E-04	0	0	0	0	0	0	0	0	1.3E-05	0	3.3E-04	0
Excessive enrichment of waters and continental surfaces with nutrients, and the associated adverse biological effects.															
Photochemical ozone creation (POPC) <i>kg Ethene equiv/FU</i>	1.3E-03	9.8E-06	7.5E-05	0	0	0	0	0	0	0	0	1.1E-06	0	0	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 resources (ADP-elements) - <i>kg Sb equiv/FU</i>	5.7E-07	1.1E-11	3.1E-08	0	0	0	0	0	0	0	0	1.2E-12	0	0	0
Abiotic depletion potential for fossil resources (ADP-fossil fuels) - <i>MJ/FU</i>	4.3E+01	8.9E-01	3.2E+00	0	0	0	0	0	0	0	0	1.0E-01	0	0	0
Consumption of non-renewable resources, thereby lowering their availability for future generations.															





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 -	2.5E+00	5.0E-04	5.2E-01	0	0	0	0	0	0	0	0	5.8E-05	0	0	0
 Use of renewable primary energy used as raw materials MJ/FU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) MJ/FU	2.5E+00	5.0E-04	5.2E-01	0	0	0	0	0	0	0	0	5.8E-05	0	0	0
 Use of non-renewable primary energy excluding non-renewable primary energy resources used as	5.0E+01	9.1E-01	3.7E+00	0	0	0	0	0	0	0	0	1.1E-01	0	0	0
 Use of non-renewable primary energy used as raw materials MJ/FU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - MJ/FU	5.0E+01	9.1E-01	3.7E+00	0	0	0	0	0	0	0	0	1.1E-01	0	0	0
 Use of secondary material kg/FU	4.2E-03	0	1.3E-02	0	0	0	0	0	0	0	0	0	0	0	0
 Use of renewable secondary fuels- MJ/FU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
 Use of non-renewable secondary fuels - MJ/FU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
 Use of net fresh water - m³/FU	1.7E-02	8.6E-05	1.4E-03	0	0	0	0	0	0	0	0	1.0E-05	0	0	0

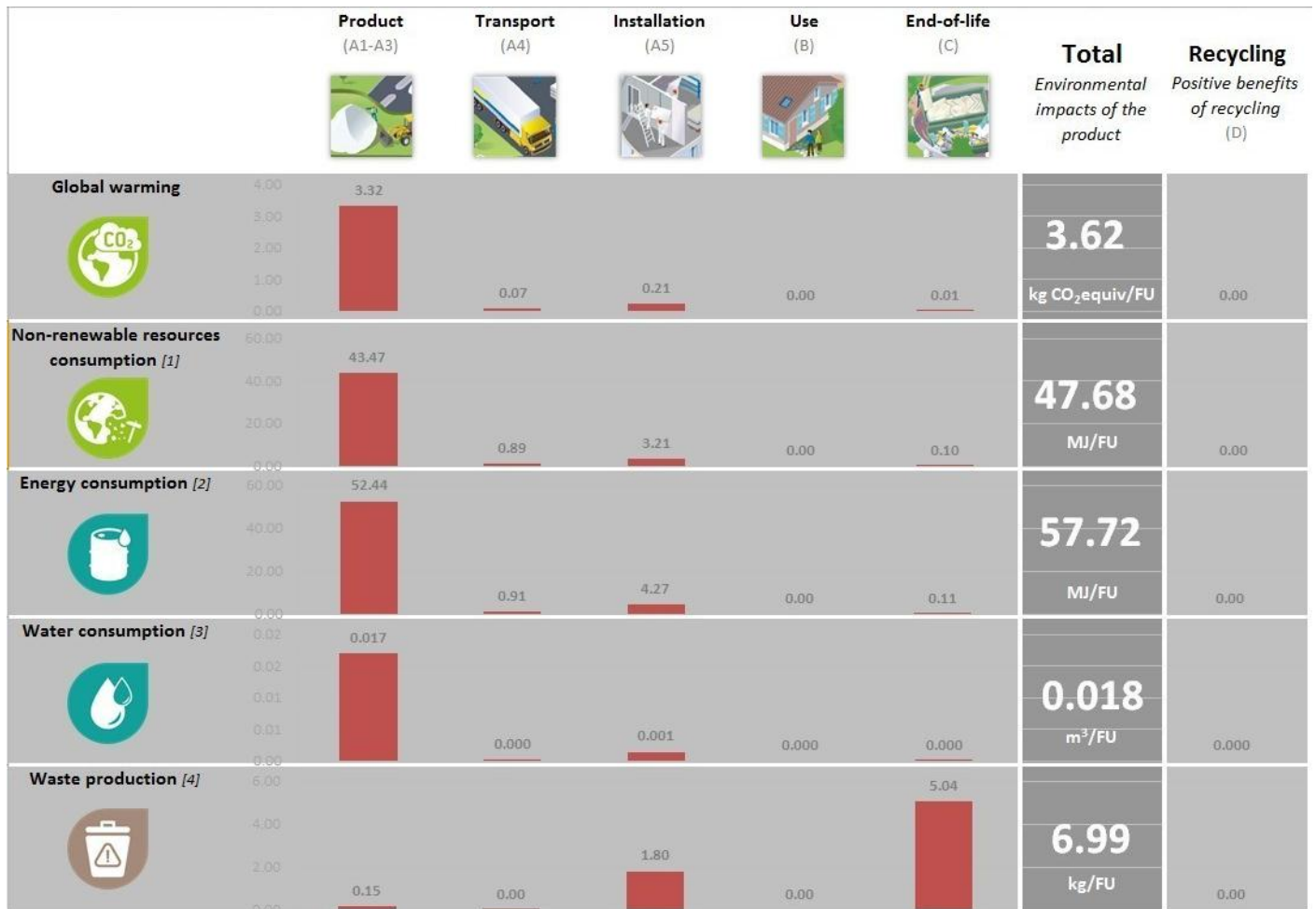
WASTE CATEGORIES

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 <i>kg/FU</i>	4.8E-02	2.1E-05	2.8E-03	0	0	0	0	0	0	0	0	2.4E-06	0	0	0
 Non-hazardous(excluding inert) waste disposed <i>kg/FU</i>	1.0E-01	7.8E-05	1.8E+00	0	0	0	0	0	0	0	0	9.0E-06	0	5.0E+00	0
 Radioactive waste disposed <i>kg/FU</i>	8.1E-05	1.4E-05	1.1E-05	0	0	0	0	0	0	0	0	1.7E-06	0	0	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 <i>kg/FU</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
 Materials for recycling <i>kg/FU</i>	3.9E-02	3.6E-07	2.0E+00	0	0	0	0	0	0	0	0	4.2E-08	0	0	0
 Materials for energy recovery <i>kg/FU</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
 Exported energy, detailed by energy carrier <i>MJ/FU</i>	1.2E-08	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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.

Environmental positive contribution & comments

Gypsum Industries Ltd (GIL) is the market leader in plasterboard & plaster manufacturing in Ireland. It is our policy to achieve the highest standards in Environmental responsibility.

We are committed to identifying hazards and eliminating risks so as to prevent and control adverse environmental impact. We are committed to the efficient use of resources, minimisation of waste and prevention of pollution. We routinely set and review achievement of specific objectives and targets for continuous improvement in the field of environmental responsibility and comply with the standards of independently verified management systems including ISO 14,001 & ISO 50,001.

GIL operates a water recycling scheme on site whereby surface water from the site is collected in a series of settling lagoons. This water is pumped back to the production facility for use in our plasterboard products. Almost 100% of production requirements can be supplied from this lagoons system (weather dependant) which reduces the amount of water we discharge and also reduces the amount of water we abstract from the local source.

GIL operates strict controls on all waste segregation activities, over 20 individual waste streams are in place across the site including metal, timber, cardboard and compostable waste. All internally generated waste is recycled on site, ensuring no production waste is landfilled.

GIL uses innovative technology where possible to reduce energy consumption and has installed heat exchangers which utilise exhaust air from one piece of equipment to pre heat the air in another piece of equipment, thereby reducing the energy required to heat from ambient temperature.

At our Mine site, we implemented an afforestation project which resulted in the planting of 40,000 trees including a mix of broadleaf and conifer species.

References;

General principles

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

PCR

The International EPD System Product Category Rules and PCR Basic Module. Construction Products and Construction Services. Version 1.0. 2012.

Saint Gobain Environmental Product Declaration Methodological Guide for Construction Products
ISO 21 930 – EN 15 804 Report SOL 11-062.1-L1
Version 3.0.1 dated April 2013 prepared for **Saint-Gobain**

Standards:

EN 15804:2012-04

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

ISO 14025:2011-10

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

ISO 9001:2008 Quality management systems – Requirements

ISO 14001:2004 Environmental management systems – Requirements with guidance for use

BS OHSAS 18001:2007 Occupational Health and Safety Management

IS EN 520 2004 + A1-2009 Gypsum Plaster Boards Definitions Requirements and test methods.