ENVIRONMENTAL PRODUCT DECLARATION

In accordance with EN 15804 and ISO 14025

PPC Italia
Gyproc DuraGyp 13 mm

Date of issue: 2016-10-25
Valid until: 2021-06-23
Version : 1

EPD VERIFIED

Gyproc SAINT-GOBAIN

The environmental impacts of this product have been assessed over its whole life cycle Its Environmental Product Declaration ha been verified by an independent third party

N° VERIFICATION

S-P-00935

ECO PLATFORM EPD EN 15804 VERIFIED

ECO EPD 00000417

EPD®

THE INTERNATIONAL EPD® SYSTEM

1. General information

Manufacturer: Saint-Gobain PPC Italia SPA
Programme used: International EPD® System (www.environdec.com)
EPD registration number/declaration number: S-P-00935
PCR identification: The International EPD System PCR for Construction Products and CPC 54 Construction Services V2, with reference to the Saint Gobain Environmental Product Declaration Methodological Guide for Construction Products
Site of manufacture: Termoli Plant, S.P. Traversa della Termolese, Z.I. Pantano Basso - TERMOLI (CB) – ITALY & Casola Plant, 10 Via Del Senio, Casola Valsenio, Ra 48010, Italy
Declaration owner: Martina Lusa

Product / product family name and manufacturer represented: Gyproc DuraGyp 13 mm, PPC Italia

Declaration issued: 2016-10-25
Valid until: 2021-06-23
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.
EPD Prepared by: Central SHEAR, Saint Gobain Gypsum. Contact. **acagen-epd.gypsum@saint-gobain.com**

Declaration of Hazardous substances: None

Environmental certifications held at both plants: ISO 14001

Scope: The EPD is based on 2014 production data for the Casola Valsenio & Termoli sites producing Gyproc DuraGyp 13 mm. This EPD covers information modules A1 to C4 (cradle to gate with options) as defined in EN 15804:2012 + A1:2013.

Geographical scope of EPD application is Italy, Egypt, Malta and Lebanon

The declared unit is 1 m^2 of Gyproc 13mm DuraGyp with a weight of 11.84 – 12.39 kg/m^2

CPC code: 37510

EPDs of construction products may not be comparable if they do not comply with EN 15804.

CEN standard EN 15804 serves as the core PCR	
PCR:	**PCR 2012:01 Construction products and Construction services, Version 2.0, 2015-03-03**
PCR review was conducted by:	**The Technical Committee of the International EPD® System. Chair: Massimo Marino.**
Independent verification of the declaration, according to EN ISO 14025:2010	[ ] **EPD process certification (Internal)** [x] **EPD verification (External)**
Third party verifier:	**Dr. Andrew Norton, Renuables** **Email: a.norton@renuables.co.uk**
Accredited or approved by:	**The International EPD® System**

2. Product description

2.1 Description of the main product components and or materials:

Special board with an increased density core (type D), where gypsum is mixed with glass and wood fibres. These characteristics give the product a high level of surface hardness, as well as mechanical resistance (type I and R). DuraGyp is a type H1 board, with a low water absorption, allowing its installation in rooms with high levels of relative humidity. It also has a reduced permeability to water vapour (type E) which allows to install it as external board, when not directly exposed to atmospheric agents. Moreover DuraGyp is type F, thus providing excellent fire resistance performances. The technology Activ'Air® allows the board to absorb and neutralize up to 70% of the formaldehyde present in the air.

2.2 Application

DuraGyp is suitable for partitions, ceilings and drywall lining, in all cases where high mechanical and impact resistance is required.

2.3 Technical data

EN CLASSIFICATION	Type D E F H1 I R, EN 520:2004+A1:2009
REACTION TO FIRE	A2-s1,d0
WATER VAPOUR RESISTANCE	8,8/4 (dry/wet)
THERMAL CONDUCTIVITY	0,25 W/mK

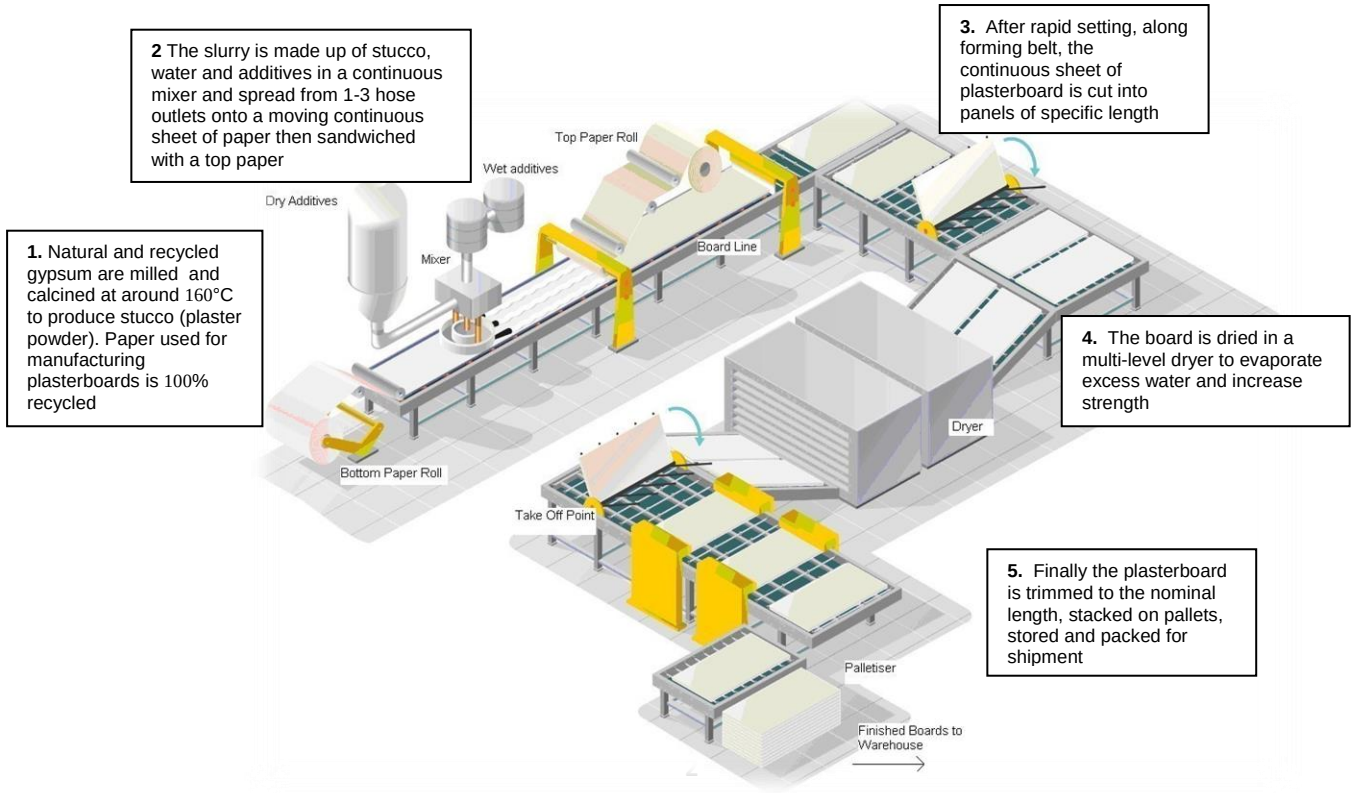
Certifications:
ISO 9001:2008 Quality Management System
ISO 14001:2004 Environmental Management System
BS OHSAS 18001:2007 Occupational Health and Safety Management

2.4 Base materials / Ancillary materials

PPC Italia provides complete solution for the installation of plasterboards. For the installation some implementation materials are needed: 0.33 kg jointing compound, 1.23 m jointing tape and 8 screws.

2.5 Manufacturing process flow

Manufacturing process flow diagram



3. LCA calculation information

DECLARED UNIT	**1 m² of installed board weighing 11.84 – 12.39 kg**
SYSTEM BOUNDARIES	Cradle to Gate with Options: Upstream & Core processes (A1 – A3), Downstream processes (A4 – A5, B1 – B7, C1 – C4)
REFERENCE SERVICE LIFE (RSL)	50 years (as per the Saint-Gobain Methodological Guide)
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	Scope includes Italy, Egypt, Malta and Lebanon. Data collected in Casola Valsenio & Termoli, Italy, 2014. CML characterisation factors are used in the impact calculation. Ecoinvent data is used having been adapted for TEAM by Ecobilan (last updated 2015).

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.

4. 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. In recent years an initiative was implemented to increase the content of recycled gypsum used for the plasterboard production. Currently 100% of the gypsum scrap from the production process is being reused.

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 declared unit)
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.	Truck with a 23 tonne average payload Diesel consumption 0.34 litres per km
Distance	260 – 500 km by truck 0 – 500 km by boat
Capacity utilisation (including empty returns)	95% volume capacity 30% empty returns
Bulk density of transported products	911 – 995 kg/m^3
Volume capacity utilisation factor	0.95

Installation in the building:

PARAMETER	VALUE (expressed per 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: 0.592 - 0.620 kg, 0.0165 kg jointing compound, 0.062 m jointing tape
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)	Board: 0.592 - 0.620 kg to landfill Jointing compound: 0.0165 kg to landfill Jointing tape: 0.062 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, 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:

PARAMETER	VALUE (expressed per declared unit) / DESCRIPTION
Maintenance process	None required during plasterboard lifetime
Maintenance cycle	None required during plasterboard lifetime
Ancillary materials for maintenance (e.g. cleaning agent, specify materials)	None required during plasterboard lifetime
Wastage material during maintenance (specify materials)	None required during plasterboard lifetime
Net fresh water consumption during maintenance	None required during plasterboard lifetime
Energy input during maintenance (e.g. vacuum cleaning), energy carrier type, (e.g. electricity) and amount, if applicable and relevant	None required during plasterboard lifetime

Repair:

PARAMETER	VALUE (expressed per declared unit) / DESCRIPTION
Repair process	None required during plasterboard lifetime
Inspection process	None required during plasterboard lifetime
Repair cycle	None required during plasterboard lifetime
Ancillary materials (e.g. lubricant, specify materials)	None required during plasterboard lifetime
Wastage material during repair (specify materials)	None required during plasterboard lifetime
Net fresh water consumption during repair	None required during plasterboard lifetime
Energy input during repair (e.g. crane activity), energy carrier type, (e.g. electricity) and amount if applicable and relevant	None required during plasterboard lifetime

Replacement:

PARAMETER	VALUE (expressed per declared unit) / DESCRIPTION
Replacement cycle	None required during plasterboard lifetime
Energy input during replacement (e.g. crane activity), energy carrier type, (e.g. electricity) and amount if applicable and relevant	None required during plasterboard lifetime
Exchange of worn parts during the product's life cycle (e.g. zinc galvanized steel sheet), specify materials	None required during plasterboard lifetime

Refurbishment:

PARAMETER	VALUE (expressed per declared unit) / DESCRIPTION
Refurbishment process	None required during plasterboard lifetime
Refurbishment cycle	None required during plasterboard lifetime
Material input for refurbishment (e.g. bricks), including ancillary materials for the refurbishment process (e.g. lubricant, specify materials)	None required during plasterboard lifetime
Wastage material during refurbishment (specify materials)	None required during plasterboard lifetime
Energy input during refurbishment (e.g. crane activity), energy carrier type, (e.g. electricity) and amount	None required during plasterboard lifetime
Further assumptions for scenario development (e.g. frequency and time period of use, number of occupants)	None required during plasterboard lifetime

Use of energy and water:

PARAMETER	VALUE (expressed per declared unit) / DESCRIPTION
Ancillary materials specified by material	None required during plasterboard lifetime
Net fresh water consumption	None required during plasterboard lifetime
Type of energy carrier (e.g. electricity, natural gas, district heating)	None required during plasterboard lifetime
Power output of equipment	None required during plasterboard lifetime
Characteristic performance (e.g. energy efficiency, emissions, variation of performance with capacity utilisation etc.)	None required during plasterboard lifetime
Further assumptions for scenario development (e.g. frequency and time period of use, number of occupants)	None required during plasterboard lifetime

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 declared unit) / DESCRIPTION
Collection process specified by type	100% of waste is collected by truck to be landfilled
Recovery system specified by type	No waste is recycled
Disposal specified by type	100% landfilled
Assumptions for scenario development (e.g. transportation)	On average, Gypsum waste is transported 32km by road from construction / demolition sites landfill sites

Reuse/recovery/recycling potential, D

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

5. LCA results

Description of the system boundary (X = Included in LCA, MNA = Module Not Assessed). The declared unit is 1 m^2 of Gyproc 13 mm – DuraGyp Plasterboard with a weight of 11.84 – 12.39 kg/m^2

CML characterisation factors are used in the impact calculation. Specific data has been supplied by the plant, and generic data come from the DEAM and Ecoinvent databases.
All emissions to air, water, and soil, and all materials and energy used have been included, with the exception of long-term emissions (>100 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	MNA

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*	3.5E+00	3.1E-01	2.6E-01	0	0	0	0	0	0	0	4.0E-02	8.0E-02	2.1E-03	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) *kg CFC 11 equiv/FU*	2.8E-07	2.1E-07	3.2E-08	0	0	0	0	0	0	0	5.0E-09	5.6E-08	5.0E-10	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 (chlorofluorocarbonsor halons), which break down when they reach the stratosphere and then catalytically destroy ozone molecules.														
Acidification potential (AP) *kg SO_2 equiv/FU*	1.0E-02	1.9E-03	8.4E-04	0	0	0	0	0	0	0	3.1E-04	4.8E-04	1.2E-05	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) *kg $(PO_4)^{3-}$ equiv/FU*	1.2E-03	4.5E-04	1.6E-04	0	0	0	0	0	0	0	7.1E-05	1.2E-04	1.4E-06	2.6E-04	0
	Excessive enrichment of waters and continental surfaces with nutrients, and the associated adverse biological effects.														
Photochemical ozone creation (POPC) *kg Ethene equiv/FU*	1.3E-03	1.4E-04	1.0E-04	0	0	0	0	0	0	0	8.9E-05	3.5E-05	8.8E-07	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 ressources (ADP-elements) - *kg Sb equiv/FU*	6.0E-07	6.6E-11	3.3E-08	0	0	0	0	0	0	0	6.3E-09	1.7E-11	3.3E-11	0	0
Abiotic depletion potential for fossil ressources (ADP-fossil fuels) - *MJ/FU*	6.6E+01	3.8E+00	4.9E+00	0	0	0	0	0	0	0	5.5E-01	9.9E-01	3.4E-02	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 *MJ/FU*	6.6E+00	2.0E-03	5.4E-01	0	0	0	0	0	0	0	2.3E-03	5.2E-04	2.5E-03	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*	6.6E+00	2.0E-03	5.4E-01	0	0	0	0	0	0	0	2.3E-03	5.2E-04	2.5E-03	0	0
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU*	5.7E+01	3.8E+00	4.5E+00	0	0	0	0	0	0	0	5.5E-01	1.0E+00	3.6E-02	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*	5.7E+01	3.8E+00	4.5E+00	0	0	0	0	0	0	0	5.5E-01	1.0E+00	3.6E-02	0	0
Use of secondary material *kg/FU*	2.0E-01	0	2.0E-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 - m^3/*FU*	1.5E-02	3.6E-04	1.6E-03	0	0	0	0	0	0	0	7.5E-05	9.5E-05	3.8E-06	0	0

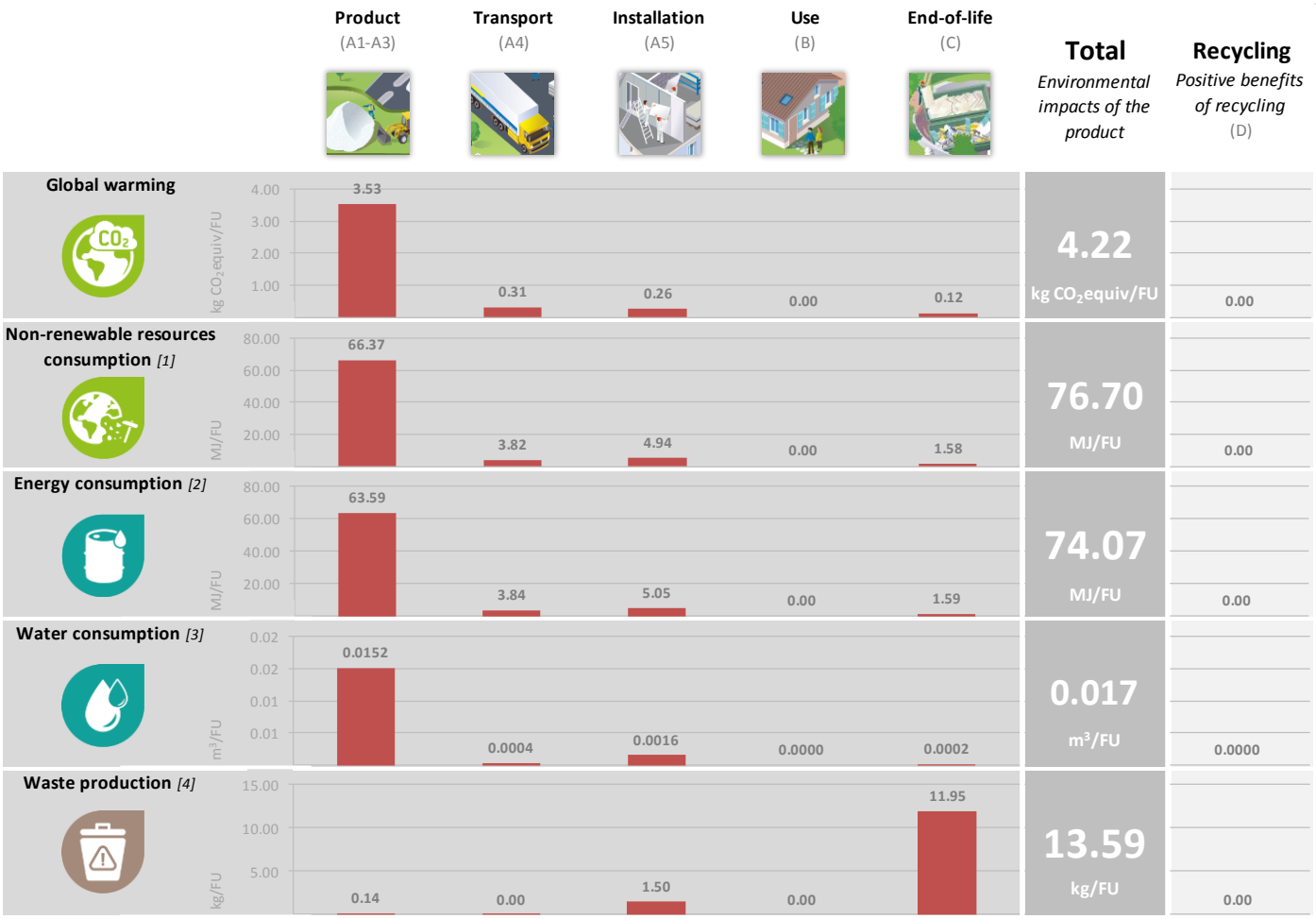
WASTE CATEGORIES

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 *kg/FU*	2.9E-02	8.5E-05	1.8E-03	0	0	0	0	0	0	0	0	2.2E-05	2.6E-07	0	0
Non-hazardous (excluding inert) waste disposed *kg/FU*	1.1E-01	4.3E-04	1.5E+00	0	0	0	0	0	0	0	0	1.1E-04	6.0E+00	6.0E+00	0
Radioactive waste disposed *kg/FU*	6.7E-05	6.1E-05	9.1E-06	0	0	0	0	0	0	0	0	1.6E-05	2.6E-07	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 *kg/FU*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Materials for recycling *kg/FU*	1.9E-01	0	0	0	0	0	0	0	0	0	0	0	0	0	-
Materials for energy recovery *kg/FU*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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



[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.

83-88% of the energy consumption for Gyproc DuraGyp 13mm comes from stages A1-A3. The natural gas use in stage A3 accounts for 50-53% of the total energy consumption. Saint-Gobain Gyproc is constantly working on environmental impact reduction and energy efficiency through ISO 14001 implementation. We focus on energy efficiency by setting objectives and implementing projects to achieve them. Aiming to reduce the consumption of natural gas, heat exchangers have been installed in the calcination area, which contributes to central heating of administrative building.

7. References

1. The International EPD System PCR for Construction Products and CPC 54 Construction Services V2

2. Saint Gobain Environmental Product Declaration Methodological Guide for Construction Products

3. EN 520:2004+A1:2009
Gypsum plasterboards - Part 1: Definitions, requirements and test methods

4. EN 15804:2012 + A1:2013
Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products

5. ISO 21930:2007
Sustainability in building construction – Environmental declaration of building products

6. ISO 14025:2006
Environmental labels and declarations – Type III environmental declarations – Principles and procedures

7. ISO 14040:2006
Environmental management. Life cycle assessment. Principles and framework

8. ISO 14044:2006
Environmental management. Life cycle assessment. Requirements and guidelines

9. ISO 9001:2008
Quality management systems. Requirements

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

11. OHSAS 18001:2007
Occupational health and safety management systems. Requirements