ENVIRONMENTAL PRODUCT DECLARATION

In accordance with EN 15804 and ISO 14025

Habito H (DFRIH1)12,5 mm

Date of issue: February 2017
Valid until: February 2022

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.

CERTIFIKAČNÍ ORGÁN PRO EPD VÚPS Certifikační společnost Výzkumný ústav pozemních staveb

N° VERIFICATION

3013EPD-17-0229

Rigips SAINT-GOBAIN

1. General information

Manufacturer: Saint-Gobain Construction Products CZ, division Rigips
Počernická 272/96, 108 03 Prague 10, Czech Republic, IČ: 25029673, DIČ: CZ25029673

About company: International company, enterprising in 64 countries, part of Saint-Gobain group, more then 190 000 employees. Subject of enterprise of Rigips division is to produce and sell plasterboards and its accessories for drywall constructions, acoustic ceiling systems, plasters and providing technical support for marketed solutions.

Programme used: National Eco-labelling Program. For more information see www.cenia.cz

EPD registration/declaration number: 3013EPD-17-0229

PCR identification: EN 15804 Sustainability of construction works – Environmental product declarations (Core rules for the product category of construction products).

Additional rules applied: Saint-Gobain Methodological Guide for Construction products April 2013. The rules in this document have been applied only where guidance is not available in EN 15804.

Product/product family name and manufacturer represented: Habito H Plasterboard (DFRIH1) manufactured by Saint-Gobain Construction Products CZ a.s., divison Rigips in Melnik- Horni Pocaply.

Declaration verified/issued: 08.02.2017

Valid until: **07.02.2022**

Owner of the declaration: Saint-Gobain Construction Products CZ a.s., division Rigips, Horni Pocaply, 254, 277 03 Horni Pocaply, Czech Republic.

EPD prepared by: Lubos Nobilis, ECO trend s.r.o., Na Dolinach 128/36, 140 00 Prague 4

Scope: The LCA is based on 2015 production data for Melnik - Horni Pocaply manufacturing site in Czech Republic for 12.5 mm Habito H Plasterboard (DFRIH1). This EPD covers information modules A1 to C4 (cradle to grave) as defined in EN 15804:2012 for 12.5 mm Habito H Plasterboard (DFRIH1) sold and used in Czech Republic, Slovakia, Germany, Switzerland, France.

The functional unit is 1m2 of installed 12.5 mm thick Habito H Plasterboard.

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]:
Mgr. Barbora Vlasatá
Building Research Institute – Certification Company Ltd.
Head od Certification Body for EPD
Pražská 16, 102 21 Praha 10 – Hostivař
Czech Republic

P.P.

CERTIFIKAČNÍ ORGÁN PRO EPD VÚPS Certifikační společnost Výzkumný ústav pozemních staveb

[a] Product Category Rules
[b] Optional for business-to-business communication; mandatory for business to consumer communication (see EN ISO 14025:2010, 9.4)

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

2. Product description

2.1 Product description

Rigips Habito H is a gypsum plasterboard type DFRIH1 according to EN 520.
Habito H is a plasterboard consisting of a special gypsum core reinforced with glass fibres and encased in strong paper liner.
Bending failure load and surface hardness of this plasterboard is higher than that of standard plasterboard. Habito plasterboard is fire resistant and impregnated.

For further details of the Rigips board properties please see technical data sheet available from www.rigips.cz

2.2 Description of use

Habito H boards are designed for use in Rigips wall and partitions systems where greater levels of sound insulation, greater levels of impact/duty, fixing capability and fire protection are required.
Habito H boards are suitable also for sheathing of elevator shafts and attack-resistant security system.

Installation according to Rigips installation instructions.

2.3 Placing on the market

UN CPC Code: 37530 Articles of plaster or of compositions based on plaster

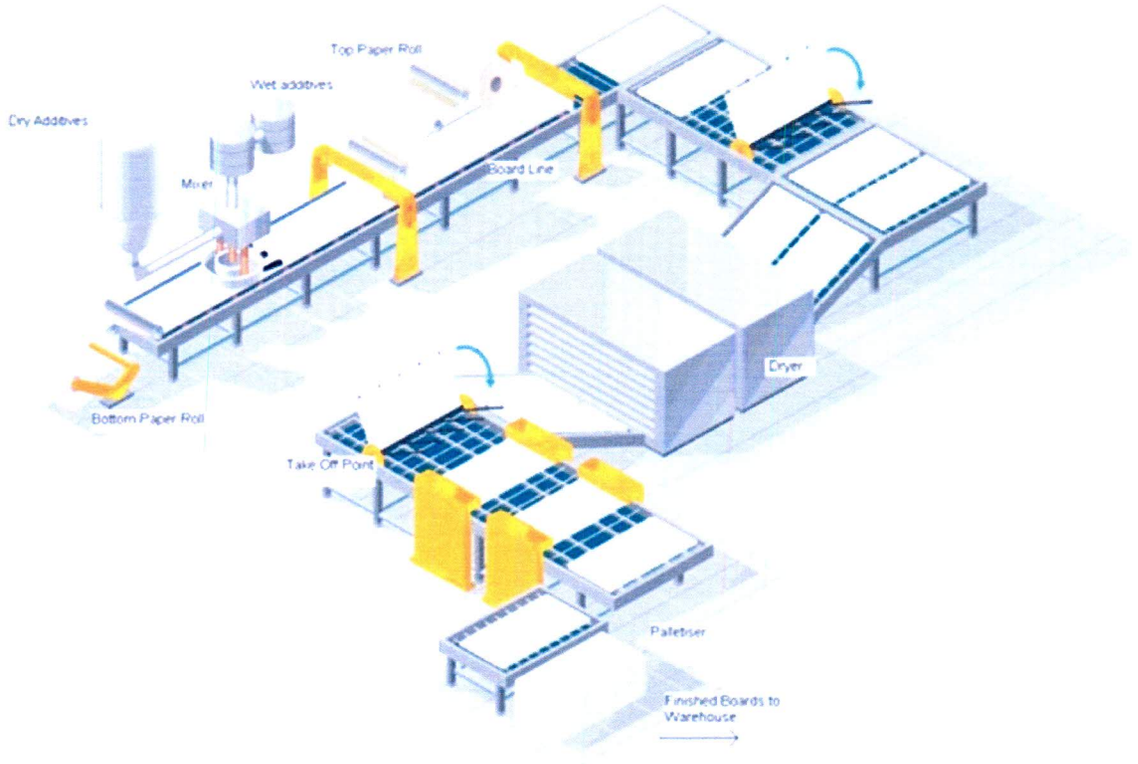
2.4 Delivery Status

The EPD refers to 12.5 mm thick Rigips Habito H Plasterboard.

2.5 Base materials/ancillary materials

Material	Part (%)	Quantity used in product (kg/m^2)	Substances of Very High Concern
Gypsum (from flue gas desulfurization)	87,41	10,49	No Substance of Very High Concern
Paper	2,59	0,31	
Glass fibre	2,41	0,29	
Additives	7,59	0,91	
Total	100,00	12,00	

2.6 Manufacture



Manufacturing process flow diagram

Plasterboard is made up of a gypsum core, mixed with wet and dry additives and encased within Paper or Glass fibre liner.

2.7 Packaging

Wooden pallets are used for packaging for the distribution and transportation of plasterboards.

2.8 Reference service life

The Reference Service Life (RSL) of the Gypsum product is considered to be 50 years. In accordance with the Plasterboard is expected to last 50 years in a building with no maintenance, before be removed and replaced as part of refurbishment work. The Saint Gobain Methodological Guide for Construction Products sets out 50 years as the standard life expectancy of the board, to be used as the Reference Service Life in all Saint-Gobain Plasterboard EPD's, unless otherwise provided by an alternative PCR.

3. LCA calculation information

DECLARED UNIT	1m² of non-installed board weighing 12 kg/m^2
SYSTEM BOUNDARIES	Cradle to Grave (RSL 50 years): Mandatory stages A1 – 3, B1 – 7, C1 – 4
ESTIMATES AND ASSUMPTIONS	The electricity production module is country specific – (Czech Republic 2013, EU 2013). Some additives, which exactly data gaps for a unit process, in total amount of weight 0,7 %, were substituted by similar substances in the model.
CUT-OFF RULES	All inputs and outputs to a (unit) process for which data is available are included in the calculation. In case of insufficient input data or data gaps for a unit process, the cut-off criteria is set at 1 % of renewable and non-renewable primary energy usage and 1 % of the total mass input of that unit process.
BACKGROUND DATA	Background data used is of less than 10 years old wherever possible. Data modules are used from the Ecoinvent database.
DATA QUALITY	Specific data has been used for the processes Saint-Gobain Construction products CZ a.s., division Rigips has influence over. Generic data has been used for the processes the company cannot influence, where present data modules have been used.
PERIOD UNDER REVIEW	The data are representative of the manufacturing processes of 2015.
ALLOCATIONS	Production data has been calculated on a mass and square basis. The main input – gypsum from flue gas desulfurization was modelled on basis of economic value of thermal power plant operations.
COMPARABILITY	A comparison or an evaluation of EPD data is only possible where EN 15804 has been followed and the same building context and product specific characteristics of performance are taken into account and the same stages have been included in the system boundary. According to EN 15804, EPD of construction products may not be comparable if they do not comply with this standard. According to ISO 21930, EPD might not be comparable if they are from different programs.
GEOGRAPHICAL COVERAGE	Scope includes manufacture and sale in Czech Republic, and sales in Slovakia, German, France and Switzerland.

4. Life cycle stages

Flow diagram of the Life Cycle

Product stage, A1-A3

Description of the stage:

The product stage of the plasterboard products is subdivided into three modules: A1, A2 and A3 respectively "raw material supply", "transport" and "manufacturing".

A1, raw material supply

This includes raw material extraction and processing, processing of secondary material input (e.g. recycling processes) and energy.

A2, transport to the manufacturer

Raw materials are transported to the manufacturing site; this includes modelling of road, boat and or train transport (with average values) for each raw material.

A3, manufacturing

The module includes manufacture of product and packaging material. Waste processing up to the end-of–waste state or disposal of final residues during the product stage is also included.

Construction process stage, A4-A5

Description of the stage:

The construction process stage is divided into two modules: A4, transport to the building site and A5, installation of the product in the building.

A4, transport to the building site

The table below quantifies the parameters for transporting the product from production gate to the building site. The distance quoted is a weighted average, calculated using customer information and the quantity of product transported.

Transport to the building site:

PARAMETER	VALUE
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.	Average truck trailer with a 28t payload, diesel consumption 0,0356 kg/tkm, EURO IV class
Distance	130 km (weighted average distance for 2015)
Capacity utilisation (including empty returns)	100 % of the capacity in volume 30 % of empty returns Due to the shape and nature of the plasterboard product it is easy to stack and therefore fits efficiently into the shape and space of a lorry container.
Bulk density of transported products	> 800 kg/m3
Volume capacity utilisation factor	1 (by default)

A5, installation into the building

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

Installation in the building

PARAMETER	VALUE
Ancillary materials for installation (specified by material	0,33 kg Jointing compound, 1,23 m jointing tape (glass fibre), 55 U-staples (0,0371 kg)
Water use	0,000165 m^3
Other resource use	None
Qualitative description of energy type (regional mix) and consumption during the installation process	None modelled
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	5 % (Gypsum product, jointing compound and jointing tape. It is assumed that there is no wastage of U-staples) 0,535 (kg) scrap plasterboard, and 0,0165 (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)	Packaging wastes (wooden pallets, PE film) are modelled as consistent with CZ waste management statistic. Gypsum waste is 14 % recycled and 86% Landfilled Jointing tape waste is 100% landfilled
Direct emissions to ambient air, soil, water	None

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).

Use stage (excluding potential savings), B1-B7

Description of the stage:
The use stage is divided into the following:

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. Rigips Habito H is a passive building product; therefore it has no impact at this stage.

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.

The Gypsum product is on average 86 % landfilled and 14 % recycled at end of life

End-of-life:

PARAMETER	VALUE/DESCRIPTION
Collection process specified by type	1,68 kg collected separately for recycling per 1 m^2 10,32 Kg collected with mixed construction waste per 1 m^2 Approximately 10% of Gypsum waste is collected in Czech and transported by truck for landfill and recycling.
Recovery system specified by type	14% recovered into other plasterboard products 1,68 kg for reuse
Disposal specified by type	86% landfilled, 14 % Recycled 10,32 kg for final deposition
Assumptions for scenario development (e.g. transportation)	Average truck trailer with a 28t payload, diesel consumption 0,0356 kg/tkm, EURO IV class 180 km for recycling part 50 km for landfilling Units as appropriate

5. LCA results – Habito H 12.5mm

Description of the system boundary (X = included in the 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: per 1 m2 of 12,5 mm Rigips Habito H

Parameters per Declared unit of 1 m^2 installed 12.5 mm plasterboard	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling
	A1 Raw material A2 Transport A3 Manufacturing	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 CO2 equiv/FU*	6,91E+00	2,21E-02	1,19E-01	0	0	0	0	0	0	0	0	8,90E-03	5,50E-03	6,07E-02	MND
	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*	8,16E-07	1,53E-09	5,73E-09	0	0	0	0	0	0	0	0	6,18E-10	4,03E-10	7,02E-09	MND
	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 SO2 equiv/FU*	2,51E-02	8,80E-05	7,76E-04	0	0	0	0	0	0	0	0	3,55E-05	3,42E-05	4,14E-04	MND
	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 (PO4)3- equiv/FU*	1,86E-02	2,08E-05	1,86E-04	0	0	0	0	0	0	0	0	8,41E-06	1,93E-05	8,35E-05	MND
	Excessive enrichment of waters and continental surfaces with nutrients, and the associated adverse biological effects.														
Photochemical ozone creation (POCP) - *kg Ethylene equiv/FU*	1,32E-03	2,97E-06	3,92E-05	0	0	0	0	0	0	0	0	1,20E-06	8,08E-07	2,05E-05	MND
	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) - *kg Sb equiv/FU*	9,10E-06	5,58E-08	4,72E-07	0	0	0	0	0	0	0	0	2,25E-08	2,30E-09	7,22E-08	MND
Abiotic depletion potential for fossil resources (ADP-fossil fuels) - *MJ/FU*	1,17E+02	3,26E-01	1,58E+00	0	0	0	0	0	0	0	0	1,32E-01	8,12E-02	1,62E+00	MND
	Consumption of non-renewable resources, thereby lowering their availability for future generations.														

RESOURCE USE: per 1 m2 of 12,5 mm Rigips Habito H

Parameters per Declared unit of 1 m^2 installed 12.5 mm plasterboard	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling
	A1 Raw material A2 Transport A3 Manufacturing	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*	3,39E+00	9,46E-03	4,58E-02	0	0	0	0	0	0	0	0	3,82E-03	7,17E-03	4,69E-02	MND
Use of renewable primary energy used as raw materials *MJ/FU*	7,86E+00	0,00E+00	0,00E+00	0	0	0	0	0	0	0	0	0,00E+00	0,00E+00	0,00E+00	MND
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU*	1,13E+01	9,46E-03	4,58E-02	0	0	0	0	0	0	0	0	3,82E-03	7,17E-03	4,69E-02	MND
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU*	1,17E+02	3,26E-01	1,58E+00	0	0	0	0	0	0	0	0	1,32E-01	8,12E-02	1,62E+00	MND
Use of non-renewable primary energy used as raw materials *MJ/FU*	5,18E-03	0,00E+00	0,00E+00	0	0	0	0	0	0	0	0	0,00E+00	0,00E+00	0,00E+00	MND
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - MJ/FU	1,17E+02	3,26E-01	1,58E+00	0	0	0	0	0	0	0	0	1,32E-01	8,12E-02	1,62E+00	MND
Use of secondary material - *kg/FU*	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0	0	0	0,00E+00	0,00E+00	0,00E+00	MND
Use of renewable secondary fuels – MJ/FU	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0	0	0	0,00E+00	0,00E+00	0,00E+00	MND
Use of non renewable secondary fuels – MJ/FU	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0	0	0	0,00E+00	0,00E+00	0,00E+00	MND
Use of net fresh water m^3/FU	5,51E-02	8,10E-05	1,47E-03	0	0	0	0	0	0	0	0	3,22E-05	7,97E-06	2,16E-03	MND

WASTE CATEGORIES: per 1 m^2 of 12,5 mm Rigips Habito H

Parameters per Declared unit of 1 m^2 installed 12.5 mm plasterboard	Product stage	Construction process stage		Use stage							End-of-life stage				D Reuse, recovery, recycling
	A1 Raw material / A2 Transport / A3 Manufacturing	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	3,64E-02	9,90E-06	1,67E-03	0	0	0	0	0	0	0	0	6,71E-06	1,16E-07	0,00E+00	MND
Non-hazardous waste disposed - kg / FU	2,33E-01	6,62E-05	1,82E+00	0	0	0	0	0	0	0	0	2,02E-05	6,05E-06	1,06E+01	MND
Radioactive waste disposed kg / FU	2,35E-05	7,26E-06	8,67E-06	0	0	0	0	0	0	0	0	5,15E-06	8,12E-08	0,00E+00	MND

OUTPUT FLOWS: per 1 m2 of 12,5 mm Rigips Habito H															
	Product stage	Construction process stage		Use stage							End-of-life stage				
Parameters per Declared unit of 1 m^2 installed 12.5 mm plasterboard	A1 Raw material A2 Transport A3 Manufacturing	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
Components for re-use *kg/FU*	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0	0	0	0	0	0	MND
Materials for recycling *kg/FU*	4,92E-03	0,00E+00	9,68E-03	0	0	0	0	0	0	0	0	0	0	0	MND
Materials for energy recovery *kg/FU*	0,00E+00	0,00E+00	0,00E+00	0	0	0	0	0	0	0	0	0	0	0	MND
Exported energy *MJ per energy carrier*	2,44E-04	0,00E+00	9,37E-03	0	0	0	0	0	0	0	0	0	0	0	MND

6. LCA results interpretation

The image below demonstrates the impact of each life cycle stage on 5 key parameters, producing a clear view of how each stage contributes to the overall environmental impacts of 12.5 mm thick Habito H (DFRIH1) Plasterboard.

Habito H (DFRIH1) results interpretation

7. Environmental contribution

The plant constantly works on increasing energy efficiency and environmental impact reduction.

ISO 9001, ISO 14001 implementation and WCM (World class manufacturing programme) helps increase environmental efficiency.

The main fuel used for production of the boards is natural gas. It accounts for over 80 % of energy usage. Significant portion (600 kW) of waste heat from production is being recovered:

1. To be re-used it in production (e.g DSG preheating)
2. To heat up plant and adjacent offices (including hot utility water supply)

Benefit from use of waste heat is about 2 % savings

De Sulphurised Gypsum, the main raw material is by-product from flue gas desulphurization plant, which is part of near power station. This secondary product is transported from power station by about 800 m long belt conveyor system, it means, there is lower environmental impact from the transport.

Production methods maximize the use of water from local sources, such as borehole abstraction, which make up 97 % of production requirements. Less than 3 % of water is taken from the public network.

The plant makes wide range of the plasterboard products, so the need for transport from distant production facilities is minimized.

All the gypsum waste generated during production is directly recycled on the site, so no gypsum waste is landfilled.

VOC emissions

The standards used widely in Europe to evaluate VOC levels in plasterboard products are EN13419 & ISO 16000. Based upon indicative testing of a sample of plasterboard products, Rigips plasterboard is estimated not to contain a VOC content or Formaldehyde content which exceeds the requirements of European voluntary labelling schemes connected with indoor air quality.

8. References

EN 15804:2012+A1

Sustainability of construction works - Environmental Product declarations - Core rules for the product category of construction products

ISO 14025:2006

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

Environmental product Declaration Saint-Gobain Methodological Guide for Construction products April 2013.

Rules for National Eco-labelling programme, Ministry of the Environment of Czech Republic, 2007