ENVIRONMENTAL PRODUCT DECLARATION

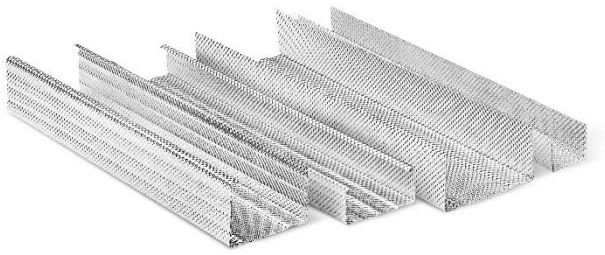
In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 and ISO 21930:2017 for:

RIGIPS® metal profiles Rigiprofil® UD/ CD/ UW/ CW & RIGIPS® UW/ CW

Version: 1
Date of publication: 2024/10/01
Validity: 5 years
Valid until: 2029/09/30
Scope of the EPD®: Europe

THE INTERNATIONAL EPD® SYSTEM

The International EPD®
Programme operator: EPD international AB
System Registration number:
EPD-IES-0015575



EPD Type: Multiple Products (average results)
Scope of the EPD®: Cradle-to-gate with options, Module C and Module D

Manufacturer address:
Mihai Viteazu, Cluj county, Romania

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

Programme information

Programme:	The International EPD® System [5]
Address:	EPD International AB - Box 210 60 - SE-100 31 Stockholm - Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

CEN standard EN 15804:2012 + A2:2019 [6] serves as the Core Product Category Rules (PCR)

Product category rules (PCR): PCR 2019:14 Construction Products, version 1.3.2 [7]

PCR review was conducted by: The Technical Committee of the International EPD® System
See www.environdec.com for a list of members.
Chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact - Contact via info@environdec.com

Independent third-party verification of the declaration and data, according to ISO 14025:2006:
☐ EPD process certification ☒ EPD verification

Third-party verifier: Dr Andrew Norton, Director of Renuables Ltd LCA. Materials. Energy
Tlf +44 (0)7900 560402 – email: a.norton@renuables.co.uk
Approved by: The International EPD® System

Procedure for follow-up of data during EPD validity involves third-party verifier: ☐ Yes ☒ No

The EPD owner has sole ownership, liability, and responsibility for the EPD.
EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804:2012+A2:2019/AC:2021 and ISO 14025:2006.

General information

Company information

Manufacturer: Saint-Gobain Construction Products Romania

Saint-Gobain designs, manufactures and distributes materials and services for the construction and industrial markets.

Site of manufacture: Mihai Viteazu, Cluj county, Romania
Management system-related certification: ISO 14001 [1], ISO 9001 [2]

Product name: RIGIPS® metal profiles Rigiprofil® UD/ CD/ UW/ CW & RIGIPS® UW/ CW
EPD for multiple products: ☐ No ☒ Yes, the EPD represents the following products:
Studs: Rigiprofil & Rigips CW and CD Studs, Rigiprofil & Rigips UW and UD Channels; Rigips high flanges UW Channels: Rigiprofil Plus CD Studs and UD Channels (See our catalogue for product information [3])
UN CPC code: 421 – Structural metal products and parts thereof

Owner of the declaration: Saint-Gobain Construction Products Romania, RIGIPS
EPD® prepared by: Ana-Maria Dumitru (ana-maria.dumitru@saint-gobain.com) and Yves Coquelet (yves.coquelet@saint-gobain.com)

Geographical scope of the EPD®: Europe
EPD® registration number: EPD-IES-0015575
Declaration issued: 2024/10/01 valid until 2029/09/30
Demonstration of verification: an independent verification of the declaration was made, according to ISO 14025:2010 [4]. This verification was external and conducted by the following third party based on the PCR mentioned above.

Product description

Product description and description of use

This Environmental Product Declaration (EPD®) describes the environmental impacts of 1 kg of RIGIPS® metal profiles- Rigiprofil® UD/ CD/ UW/ CW and RIGIPS® UW/ CW as installed.

RIGIPS® metal profiles- Rigiprofil® UD/ CD/ UW/ CW and RIGIPS® UW/ CW is a product group that includes a large range of light-gauge steel framing products made of hot-dip galvanized steel. The product group includes studs and channels profiles that are designed as framing components for gypsum plasterboard systems as well as for the construction of ceilings & attics, partion walls, etc.

These products are all made using the same main raw material, galvanized steel coil graded DX51D +Z100, and via the steel profiling technology used at the manufacturing site in Mihai Viteazu, Cluj County. While the ranges of product cover thicknesses 0.60 mm, lengths 2000 to 9000 mm and widths 29 to 150mm.

Rigiprofil UD/ CD/ UW/ CW have width between 29 and 100mm and the rigidity of Rigiprofil® profiles is enhanced by sheet metal embossing, made with UltraSTEEL® technology.

RIGIPS® UW/ CW have width over 50mm until 150mm (plane profile) and wings from 40 to 140mm, used mainly in special partion walls.

Hence, it has been deemed suitable to produce an EPD for an average framing product to represent all metal profiles under the umbrella of RIGIPS® Metal Profiles.

Technical data/physical characteristics:

Reaction to fire*	A1	As EN 13501 [8] and EN 14915 [9]
Density	7925kg/m^3	-
Steel grade	DX51D + Z100 (as delivered)	As EN 10345 [10]
Yield strength*	240 N/mm^2	As EN 14915
Profile thickness	0.6 mm	-

*As stated in the Declaration of Performance (DoP) for RIGIPS® Metal Profiles [11]

Declaration of the main product components and/or materials

All raw materials contributing more than 5% to any environmental impact are listed in the following table.

Product components	**Mass (%)**	**Post-consumer material weight (%)**
Galvanised steel	> 99	0*
Other components	< 1	0
Sum	**100%**	**0**
Packaging materials	**Weight (kg)**	**Weight (%)**
PET straps	0.00051	98

*The worst-case of 0% post-consumer material is declared due to the amount of post-consumer scraps used by our suppliers is unknown. However, the generic data used assumes 19% of scraps are used in blast furnace steel production.

During the life cycle of the product any hazardous substance listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorization” [12] 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 for the legality of the product.

Raw material category	Product (mass %)	Packaging (mass %)
Metals	> 99	0
Minerals	0	0
Fossil materials	< 1	98

LCA calculation information

TYPE OF EPD	Cradle to grave and module D
DECLARED UNIT	1 kg of Metal Profile (RIGIPS® & Rigiprofil®), as installed
SYSTEM BOUNDARIES	A1-A5, B1-B7, C1-C4 and D
REFERENCE SERVICE LIFE (RSL)	50 years. By default, it corresponds to standard building design life, and it is noted that internal metal profiles are in place for this duration.
CUT-OFF RULES	In the case that there is not enough information, the process energy and materials representing less than 1% of the whole energy and mass used can be excluded (if they do not cause significant impacts). The addition of all the inputs and outputs excluded cannot be bigger than 5% of the mass and energy used, as well as emissions to the environment, per module. The construction of plants, production of machines and transportation systems, (i.e. any infrastructure) are excluded since the related flows are supposed to be negligible compared to the production of the product when compared to the system's lifetime level. However, we note that some generic datasets used in the LCA model may include capital goods and infrastructure within their system boundaries. Flows related to human activities such as employee transport are also excluded.
ALLOCATIONS	The allocation criteria are based on the mass flow of products and co-products – i.e. mass allocation between the different product ranges produced in Cluj county, Romania. Where raw materials and energy usage cannot be directly attributed to individual products the total quantity used in the factory was divided by the total mass of products produced to achieve materials and energy per kilogram of product. The polluter pays and modularity principles have been followed. The impact arising from the treatment of waste generated within the system boundaries is allocated to the product until waste reaches the end-of-waste state.
GEOGRAPHICAL COVERAGE AND TIME PERIOD	Scope: Romania (production), Global (use and disposal) Data is collected from one production site located in Mihai Viteazu, Cluj county Romania by Saint-Gobain Construction Products Romania Data collected for the year: 2023
BACKGROUND DATA SOURCE	The databases Sphera 2023.2 and ecoinvent v.3.9.1 [13] [14]
SOFTWARE	Sphera LCA for experts (GaBi) 10 [15]
LCA METHODOLOGY	In addition to EN 15804:2019+A2 and PCR 2019:14, the study was carried out in accordance with ISO 14040:2006 [16], ISO 14044:2006 [17], and GPI for the International EPD® system [18]

According to EN 15804:2012+A2:2019, EPDs of construction products may not be comparable if they do not comply with this standard. According to ISO 21930: 2017 EPDs might not be comparable if they are from different programmes.

LCA scope

System boundaries (X=included. 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
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	EU		RO	EU													
Specific data used*	>90% GWP- GHG																
Variation products	<10%																
Variation sites	0%																

*Share of specific data that is specified according to PCR 2019:14. We gathered site-specific data on the generation of electricity provided by contracted suppliers (using Guarantee of Origin), transportation data on distances, means of transportation, load factor, fuel/other energy consumption at the site. The value in the table is calculated on the share of impact deriving from LCI data from databases on transportation and energy ware that are combined with actual transportation and energy parameters.

Life cycle stages

A1-A3, Product stage

Modules A1-A3 sit within the product stage of a building's life cycle, where raw and secondary materials are extracted and processed (A1) before being transported (A2) to manufacturing facilities for the fabrication of building products (A3). Here we detail A1-A3 for Metal Profile (RIGIPS® & Rigiprofil®) - produced at Mihai Viteazu. Information on the supply of materials and manufacturing of the product(s), input materials and the processing of waste materials were data from Saint-Gobain Construction Products Romania, RIGIPS. Electricity used at the Mihai Viteazu manufacturing site was modelled based on the power mix purchased with a Guarantee of Origin (GO)/residue electricity mix from the RO market.

The aggregation of the modules A1, A2, and A3 is a possibility considered by the EN 15804 standard. This rule is applied in this EPD.

A1: Raw materials supply
Raw materials that are required to manufacture the Metal Profile (RIGIPS® & Rigiprofil®) are supplied from various countries around Romania. These raw materials can be categorised as “natural” materials and “processed” materials. Materials supplied to the product manufacturing site are all “processes”, steel coils are processed materials manufactured from iron ore, a natural material).

The use of electricity, fuels, and auxiliary materials in production is taken into account too. The environmental profile of these energy carriers is modelled for local conditions.

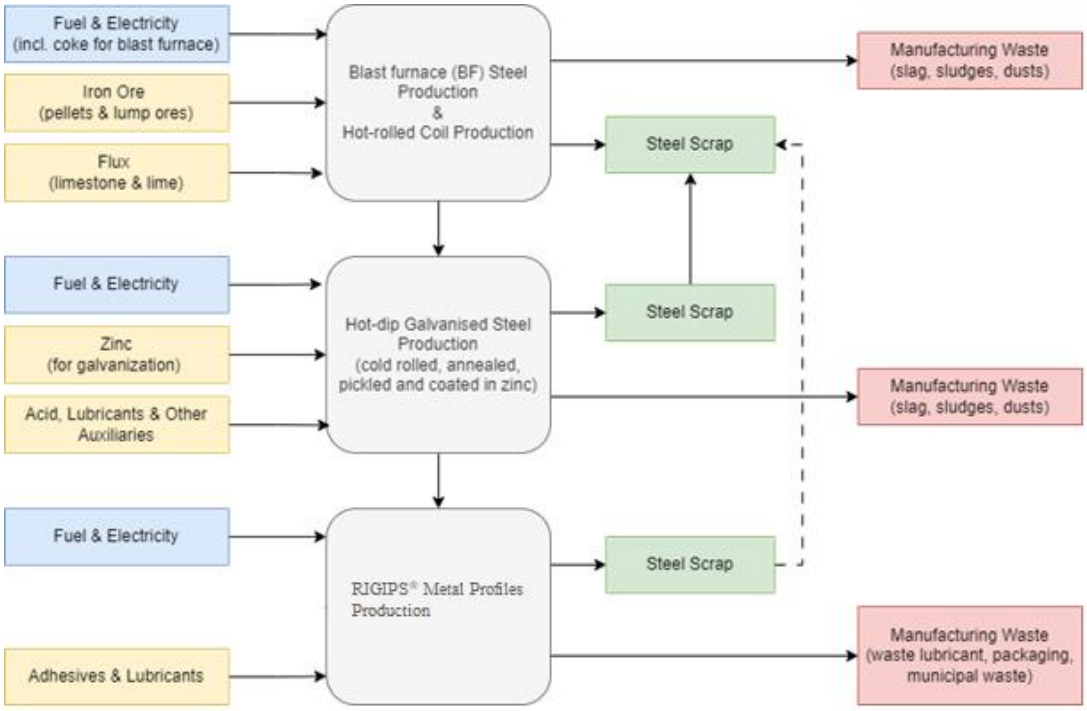
A2: Transport to the manufacturer
The raw materials are transported to the manufacturing site. The modelling includes road, boat and/or train transportation of each raw material.

A3: Manufacturing
See Process Flow Diagram for a complete breakdown of the manufacturing process.

In A3, other processes modelled include:

- The processing of waste arising from the manufacturing process. How manufacturing waste is processed was based on waste reports from waste contractors, the worst-case process was used (landfill and incineration).
- The combustion of refinery products, such as natural gas, is related to the production process.
- Packaging-related flows in the production process and all upstream packaging are included in the manufacturing module, i.e. wooden pallets and polypropylene packaging.
  - In addition to the production of packaging material, the supply and transport of packaging material are also considered in the LCA model. They are reported and allocated to the module where the packaging is applied. Data on packaging waste created during this step are then generated.

Manufacturing process flow diagram



Manufacturing in detail

The figure above shows the main processes associated with manufacturing RIGIPS® Metal Profiles which include steel manufacturing processes that occur at our steel supplier's site (i.e. the blast furnace steel and hot-dip galvanised steel productions).

Metal Profiles (RIGIPS® & Rigiprofil®) are manufactured using hot-dip galvanized steel coil produced and sourced from multiple suppliers around the world. Our suppliers for steel coils generally manufacture via the blast furnace/basic oxygen furnace (BF/BOF) route. The blast furnace route produces pig iron from various forms of iron ore such as sinter, pellets and lump ore with coke as a reducing agent. The pig iron is transferred to the BF vessel, where it is converted to steel by reducing the carbon content. The BF vessel is also used to regulate other chemical properties of the steel such as the alloy content. Steel scrap is used in the BF vessel, primarily for temperature control.

Liquid steel from the BF vessel is cast into slabs and rolled to produce hot-rolled coils. To produce hot-dip galvanized steel, the hot-rolled coil is cold-rolled, annealed, pickled and coated in zinc. Hot-dip galvanized steel coils are formed and cut into the specific profiles required for the building application, i.e. manufactured into RIGIPS® products at our

designated site in Mihai Viteazu, Romania. The products are packaged in PET straps and loaded to distribution.

A4-A5, Construction process 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

Distribution distances of products were obtained by mapping the transport distances from the Mihai Viteazu manufacturing site to Saint-Gobain Construction Products Romania, RIGIPS Turda and then to distribution locations and to the client. The average distance was then taken along with the typical mode and load of transport to form the transport scenario. All clients were included in the calculation from the year 2023, no assumptions or cut-offs were made to find the average distribution distance. Additionally, it's assumed that no product is lost, broken or wasted during transportation due to the efficiency of our courier and our packing process.

NATIONAL PARAMETERS (87.5% OF SALES)	VALUE
Fuel type and vehicle type e.g. long-distance truck, boat, etc.	Long-distance truck: 28t payload capacity Euro 0 – 6 mix Fuel type: Diesel
Distance	324.6 km
Average load weight	27 tonnes
Empty return	18%
Average utilisation	75%

A5: Installation in the building

The scenario for the installation of 1kg of Metal Profiles (RIGIPS® & Rigiprofil®) were developed in consultation with Saint-Gobain RIGIPS technical team and product technical data sheets for the average installation requirements for typical RIGIPS® products. The installation typically requires screws and a small amount of energy use from tools. 5% product loss was assumed and resupply of the losses was modelled. Romania waste stats were applied to modelling the disposal of steel. However, worst-case scenario, landfill, was modelled for packaging waste.

PARAMETER	VALUE/DESCRIPTION
Ancillary materials for installation	Screws: 2 units
Electricity use	0.2 kWh
Wastage output from installation	Product: 0.05 kg (92% recycled, 8% landfilled) Polypropylene: 0.00072 kg (worst-case: 100% landfilled)
Direct emissions	None

B1-B7, Use stage

The use stage, related to the building fabric is separated into seven modules. The following describes the use of RIGIPS® Metal Profiles over its RSL, 60 years, which corresponds to a building's standard life span.

B1: Use (or application of the installed product)

This model represents any emissions to the environment of the installed product. Emissions to the environment are not attributable to Metal Profile (RIGIPS® & Rigiprofil®).

B2: Maintenance; B3: Repair; B4: Replacement; B5: Refurbishment

No maintenance, repair, replacement or refurbishment is required after the implementation of Metal Profile (RIGIPS® & Rigiprofil®). Therefore, no impact has been accounted for in these modules.

B6: Operational energy use; B7: Operational water use
Metal Profile (RIGIPS® & Rigiprofil®) are not related to any electricity or water use during the operation of the building. Therefore, no impact has been accounted for in these modules.

C1-C4, End of life stage

The end-of-life scenario for Metal Profile (RIGIPS® & Rigiprofil®) was developed based on Saint-Gobain's own knowledge and confirmation of customers for the deconstruction and demolition of the product from the building (C1). Since products are distributed in the RO, RO waste statistics [21] for metal were used to determine the EoL of the steel profiles.

C1: Deconstruction, demolition
The deconstruction and/or dismantling process of Metal Profile (RIGIPS® & Rigiprofil®) is assumed to be deconstructed as part of the entire building. These processes mainly use energy for mechanical operations. In our case, a small amount of energy is considered 0.0437 MJ/kg.

C2: Transport to waste processing
As there is no data for the transport of waste after its use, the default distance of 100 km of an average truck used at 85% capacity was assumed.

C3: Waste processing for reuse, recovery and/or recycling
The percentage of product waste recovered for recycling considered Romania waste statistics on non-hazardous construction demolition waste recovered in the Romania and "Metallic wastes, ferrous" (from all sectors) recovered for recycling. It was determined that 100% of waste it is landfill.

C4: Disposal
There is no reuse nor recovery nor recycling of the product. Hence, no recycling benefits are reported in module D.

PARAMETER	VALUE/DESCRIPTION
Collection process specified by type	95% collected separately for recycling and 5% collected with mixed deconstruction and demolition waste
Assumptions for scenario development (e.g. transportation)	Waste is transported 50 km by truck from deconstruction or demolition sites to either landfill or recycling sites

D, Reuse/Recovery/Recycling potential

As scraps are typically used to produce blast furnace steel (the main raw material for Metal Profile (RIGIPS® & Rigiprofil®), and the product is mostly recycled at its end-of-life, loads and benefits for using secondary material and recycling steel scraps were calculated in Module D. It was assumed that recovered steel scraps are used to produce steel billets/slabs produced via electric arc furnaces, which replaces steel billets and slabs produced via blast furnace.

LCA results

As specified in EN 15804:2012+A2:2019/AC:2021 and the Product-Category Rules, the environmental impacts are declared and reported using the baseline characterisation factors from the EC-JRC. Specific data has been supplied by the plant, and generic data come from Sphera and ecoinvent databases. Characterisation factors EN15804 based on EF 3.1.

The estimated impact results are only relative statements which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins or risks.

All emissions to air, water, and soil, and all materials and energy used have been included.

The results of the impact categories abiotic depletion of minerals and metals, land use, human toxicity (cancer), human toxicity, noncancer and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological, and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

All figures refer to a declared unit of 1 kg of Metal Profile (RIGIPS® & Rigiprofil®), as installed.

The following results correspond to a product range manufactured in a single plant: Mihai Viteazu.

Environmental impacts

Environmental indicators	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				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	D Reuse, recovery, recycling
Climate Change [kg CO2 eq.]	3.75E+00	7.65E-03	1.53E-01	0	0	0	0	0	0	0	4.44E-03	2.99E-03	2.41E-03	7.49E-04	-1.33E+00
Climate Change (fossil) [kg CO2 eq.]	3.73E+00	7.56E-03	1.52E-01	0	0	0	0	0	0	0	4.44E-03	2.95E-03	2.39E-03	7.47E-04	-1.33E+00
Climate Change (biogenic) [kg CO2 eq.]	2.26E-01	5.38E-04	8.57E-03	0	0	0	0	0	0	0	6.26E-06	2.11E-04	1.90E-04	9.80E-05	4.69E-02
Climate Change (land use change) [kg CO2 eq.]	4.20E-03	7.11E-05	1.29E-04	0	0	0	0	0	0	0	8.45E-08	2.79E-05	1.83E-05	2.18E-06	-5.59E-04
Ozone depletion [kg CFC-11 eq.]	7.38E-08	6.72E-16	1.92E-09	0	0	0	0	0	0	0	3.42E-16	2.64E-16	4.07E-15	2.81E-18	3.95E-12
Acidification terrestrial and freshwater [Mole of H+ eq.]	7.77E-02	8.83E-06	2.15E-03	0	0	0	0	0	0	0	6.99E-06	1.78E-05	1.27E-05	5.44E-06	-3.03E-03
Eutrophication freshwater [kg P eq.]	1.71E-03	2.80E-08	4.46E-05	0	0	0	0	0	0	0	8.58E-10	1.10E-08	8.27E-09	1.30E-09	-9.97E-08
Eutrophication marine [kg N eq.]	5.87E-03	3.05E-06	1.85E-04	0	0	0	0	0	0	0	2.42E-06	8.71E-06	5.82E-06	1.40E-06	-7.28E-04
Eutrophication terrestrial [Mole of N eq.]	3.11E-01	3.59E-05	8.42E-03	0	0	0	0	0	0	0	2.67E-05	9.66E-05	6.43E-05	1.54E-05	-7.88E-03
Photochemical ozone formation - human health [kg NMVOC eq.]	1.74E-02	7.68E-06	5.56E-04	0	0	0	0	0	0	0	7.31E-06	1.64E-05	1.58E-05	4.24E-06	-2.43E-03
Resource use, mineral and metals [kg Sb eq.]	2.09E-04	4.98E-10	6.53E-06	0	0	0	0	0	0	0	4.49E-11	1.96E-10	2.60E-09	6.83E-11	-1.40E-08
Resource use, energy carriers [MJ]	5.33E+01	1.04E-01	1.94E+00	0	0	0	0	0	0	0	5.91E-02	4.10E-02	4.78E-02	9.95E-03	-9.96E+00
Water deprivation potential [m³ world equiv.]	1.72E+00	8.84E-05	4.64E-02	0	0	0	0	0	0	0	1.14E-05	3.48E-05	4.73E-04	7.95E-05	-1.92E-02

Resources use

Resources use indicators	PRODUCT STAGE	CONSTRUCTION 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	D Reuse, recovery, recycling
Use of renewable primary energy (PERE) [MJ]	9.27E+00	7.38E-03	3.56E-01	0	0	0	0	0	0	0	2.61E-04	2.90E-03	4.45E-03	1.30E-03	1.66E+00
Primary energy resources used as raw materials (PERM) [MJ]	8.74E-05	0.00E+00	1.59E-06	0	0	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (PERT) [MJ]	9.28E+00	7.38E-03	3.56E-01	0	0	0	0	0	0	0	2.61E-04	2.90E-03	4.45E-03	1.30E-03	1.66E+00
Use of non-renewable primary energy (PENRE) [MJ]	5.33E+01	1.05E-01	1.94E+00	0	0	0	0	0	0	0	5.92E-02	4.11E-02	4.80E-02	9.96E-03	-1.01E+01
Non-renewable primary energy resources used as raw materials (PENRM) [MJ]	1.15E-02	0.00E+00	3.00E-04	0	0	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (PENRT) [MJ]	5.33E+01	1.05E-01	1.94E+00	0	0	0	0	0	0	0	5.92E-02	4.11E-02	4.80E-02	9.96E-03	-1.01E+01
Input of secondary material (SM) [kg]	1.32E-01	0.00E+00	3.43E-03	0	0	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF) [MJ]	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non renewable secondary fuels (NRSF) [MJ]	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water (FW) [m3]	4.30E-02	8.14E-06	1.23E-03	0	0	0	0	0	0	0	4.24E-07	3.20E-06	1.37E-05	2.51E-06	-8.60E-04

Waste category and output flows

	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				D REUSE, RECOVERY, RECYCLING
Waste category and output flows	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	D Reuse, recovery, recycling
Hazardous waste disposed (HWD) [kg]	1.84E-09	3.87E-13	1.41E-08	0	0	0	0	0	0	0	1.71E-13	1.52E-13	-1.24E-13	1.52E-10	-2.54E-11
Non-hazardous waste disposed (NHWD) [kg]	1.35E-03	3.87E-13	3.51E-05	0	0	0	0	0	0	0	1.71E-13	1.52E-13	-1.24E-13	1.52E-10	-2.52E-11
Radioactive waste disposed (RWD) [kg]	4.20E-04	1.35E-07	2.36E-05	0	0	0	0	0	0	0	6.84E-08	5.31E-08	6.43E-07	1.13E-07	1.77E-04
Components for re-use (CRU) [kg]	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for Recycling (MFR) [kg]	7.88E-03	0.00E+00	2.05E-04	0	0	0	0	0	0	0	0.00E+00	0.00E+00	9.50E-01	0.00E+00	0.00E+00
Material for Energy Recovery (MER) [kg]	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported electrical energy (EEE) [MJ]	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy (EET) [MJ]	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Optional indicators

	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				D REUSE, RECOVERY, RECYCLING
Optional indicators	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	D Reuse, recovery, recycling
Respiratory inorganics [Disease incidences]	6.58E-07	5.71E-11	1.88E-08	0	0	0	0	0	0	0	3.92E-11	1.04E-10	2.41E-10	6.74E-11	-4.43E-08
Ionising radiation - human health [kBq U235 eq.][1]	2.14E-01	1.95E-05	6.85E-03	0	0	0	0	0	0	0	9.66E-06	7.67E-06	1.04E-04	1.17E-05	1.96E-02
Ecotoxicity freshwater [CTUe][2]	6.96E+01	7.35E-02	1.92E+00	0	0	0	0	0	0	0	4.19E-02	2.89E-02	3.19E-02	5.67E-03	-1.54E+00
Cancer human health effects [CTUh][3]	1.82E-08	1.48E-12	5.36E-10	0	0	0	0	0	0	0	1.01E-12	5.83E-13	7.02E-13	8.43E-13	-2.07E-09
Non-cancer human health effects [CTUh][3]	9.05E-08	6.54E-11	2.66E-09	0	0	0	0	0	0	0	2.43E-11	2.57E-11	2.55E-11	8.91E-11	1.60E-09
Land use [Pt]	1.96E+01	4.35E-02	6.00E-01	0	0	0	0	0	0	0	1.97E-04	1.71E-02	1.29E-02	2.08E-03	9.38E-01

[1] The ionising radiation category deals mainly with the eventual impact of low-dose ionising radiation on the human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure, or radioactive waste disposal in underground facilities. Potential ionising radiation from the soil, radon and some construction materials is also not measured by this indicator.

[2] The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Additional voluntary indicators from EN 15804 (according to ISO 21930:2017)

	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				REUSE, RECOVERY RECYCLING
Environmental indicators	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	D Reuse, recovery, recycling
Climate Change [kg CO_2 eq.][3]	3.74E+00	7.65E-03	1.53E-01	0	0	0	0	0	0	0	4.44E-03	2.99E-03	2.42E-03	7.51E-04	-1.33E+00

[3] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Information on biogenic carbon content

		PRODUCT STAGE
Biogenic carbon content		**A1 / A2 / A3**
	Biogenic carbon content in product [kg]	0.00E+00
	Biogenic carbon content in packaging [kg]	2.28E-06

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Additional information

Electricity information

TYPE OF INFORMATION	DESCRIPTION
Electricity purchaser	Electricity purchased by Saint-Gobain & Kovostroj
Electricity provider	From Romania
Electricity mix	Coal 17.05% Natural gas 17.36% Nuclear 20.09% Hydro 27.40% Wind, solar, etc. 17.20% Biofuels and wast 0.06% Oil 0.08% Biomass 0.75%
Reference year	2022
Type of dataset	Cradle to gate from GaBi and ecoinvent databases
CO_2 emissions kg CO_2 eq. / kWh	Certificate issue = 0 kg CO_2 / kWh Modelled impact = 0.057 kg CO_2 / kWh

*Kovostroj manages the manufacturing site that produces Metal Profile (RIGIPS® & Rigiprofil®).

The factory based in Mihai Viteazu uses electricity with Guarantee of Origin certificate (GO's).
Hence, the electricity mix considered for the manufacturing of the studied product is modelled according to the electricity mix described in the Guarantee of Origin certificate. The amount of electricity purchased with GO's covers 25% of the electricity consumption on the manufacturing site.

TYPE OF INFORMATION	DESCRIPTION
Location	Electricity produced by Kovostroj
Share of electricity covered by Guarantee of Origin	25% of the energy consumption is covered by the GO
Energy sources for electricity	Share of energy sources: Photovoltaic 100%
Type of dataset	Cradle to gate from GaBi and ecoinvent databases

Source	Cradle to gate from Gabi and ecoinvent databases Guarantee of Origin certificate:
CO_2 emission kg CO_2 eq. / kWh	0.0 kg of CO2 eq/kWh - Climate Change - fossil indicator

Data quality

Inventory data quality is judged by geographical, temporal and technological representativeness. To cover these requirements and to ensure reliable results, first-hand industry data crossed with LCA background datasets were used. The data was collected from internal records and reporting documents from Saint Gobain Construction Products RIGIPS, Romania. After evaluating the inventory, according to the defined ranking in the LCA report, the assessment reflects 100% inventory data quality.

Environmental impacts according to EN 15804:2012 + A1

The following table presents the results of 1 kg RIGIPS® Metal Profiles, as installed. Note that EN 15804:2012 +A1 is expired [21].

	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				REUSE, RECOVERY, RECYCLING
Environmental impacts	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	D Reuse, recovery, recycling
Global Warming Potential (GWP) [kg CO_2 eq.]	3.73E+00	7.56E-03	1.52E-01	0	0	0	0	0	0	0	4.44E-03	2.95E-03	2.39E-03	7.47E-04	-1.33E+00
Ozone depletion (ODP) [kg CFC 11eq.]	2.26E-01	5.38E-04	8.57E-03	0	0	0	0	0	0	0	6.26E-06	2.11E-04	1.90E-04	9.80E-05	4.69E-02
Acidification potential (AP) [kg SO_2eq.]	4.20E-03	7.11E-05	1.29E-04	0	0	0	0	0	0	0	8.45E-08	2.79E-05	1.83E-05	2.18E-06	-5.59E-04
Eutrophication potential (EP) [kg $(PO_4)^{3}$-eq.]	7.38E-08	6.72E-16	1.92E-09	0	0	0	0	0	0	0	3.42E-16	2.64E-16	4.07E-15	2.81E-18	3.95E-12
Photochemical ozone creation (POCP) - [kg Ethylene eq.]	7.77E-02	8.83E-06	2.15E-03	0	0	0	0	0	0	0	6.99E-06	1.78E-05	1.27E-05	5.44E-06	-3.03E-03
Abiotic depletion potential for non-fossil resources (ADP-elements) [kg Sb eq.]	1.71E-03	2.80E-08	4.46E-05	0	0	0	0	0	0	0	8.58E-10	1.10E-08	8.27E-09	1.30E-09	-9.97E-08
Abiotic depletion potential for fossil resources (ADP-fossil fuels) [MJ]	5.87E-03	3.05E-06	1.85E-04	0	0	0	0	0	0	0	2.42E-06	8.71E-06	5.82E-06	1.40E-06	-7.28E-04

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