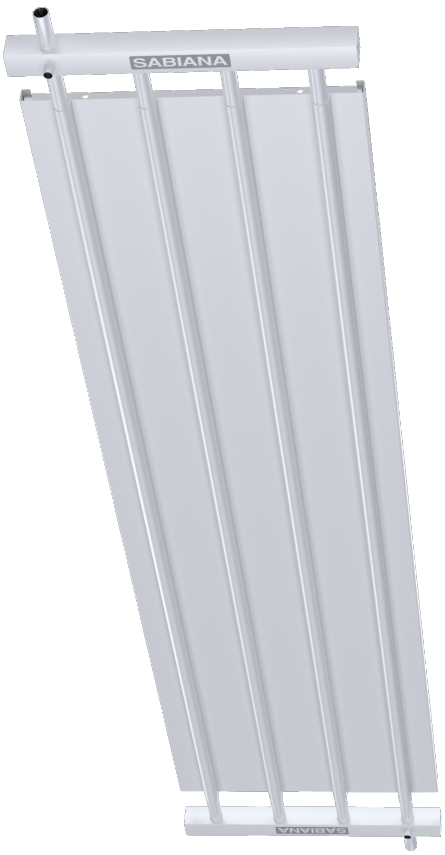


Environmental Product Declaration

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

Radiant panel – Duck Strip 4.1

From **Sabiana S.p.A.**

EPD of multiple products, based on a representative product.
Included products:

- DS-ST18: 18-3-030, 18-3-060, 18-3-090, 18-3-120, 18-3-150, 18-4-030, 18-4-060, 18-4-090, 18-4-120
- DS-ST28: 28-2-030, 28-2-045, 28-2-060, 28-2-075, 28-2-090, 28-2-105, 28-2-120, 28-2-135, 28-2-150
- DS-SP28: 28-2-030, 28-2-045, 28-2-060, 28-2-075, 28-2-090, 28-2-105, 28-2-120, 28-2-135, 28-2-150

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	EPD-IES-0005872
Publication date:	2024-12-17
Valid until:	2029-12-17

General information

Programme information

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

Accountabilities for PCR and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): Construction Products, 2019:14, version 1.3.4
PCR review was conducted by: Technical Committee of the International EPD® System. The review panel may be contacted via info@environdec.com
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: Guido Croce 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 the 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 and ISO 14025.

About Sabiana S.p.A

Sabiana is an Italian manufacturer of heating and air conditioning products, leader for hydronic terminal fan coil unit.

Founded in 1929 in Milan, from 2014 is part of the Arbonia Group, a group listed on the SIX Swiss Exchange, global force in the building components sector, operating actively in over 70 countries and maintains major manufacturing facilities in Italy, Switzerland, Germany, the Czech Republic, Poland, Serbia and Belgium.

Sabiana headquarter is located in Corbetta (MI) and production facilities are all located nearby: two sites in Corbetta (MI) and two sites in Magenta (MI).

Sabiana's continuous innovation and quality enhancement strategy is pursued by the continuous R&D investments, with the adoption of advanced 3D design and simulations and modern laboratories for product testing and inspection, by continuous investments on advanced production equipment and new technologies and by the implementation of IoT across the organization.
Strong commitment to quality and sustainability is witnessed by the long-held ISO 9001 certification of the company and the ISO 14001 certification of the main production sites.
Sustainability and Circular Economy became pillars of the company strategy, with the main results[1] of:

- 96.6% of production material sourced from the European Union (of which 83.6% from Italian suppliers, most of them located in a short distance)
- Self-production of 60% of the overall electrical energy consumption, with the target of 80% in few years
- Continuous increase of % of reusable and recyclable materials in production

The Plants

Name and location of production site(s):
Sabiana plant involved in the production process of radiant panels is:
Sabiana 1: via Piave 53, 20011 Corbetta (MI), Italy

Aerial view of Sabiana headquarter

[1] Referred to 2022

Product information

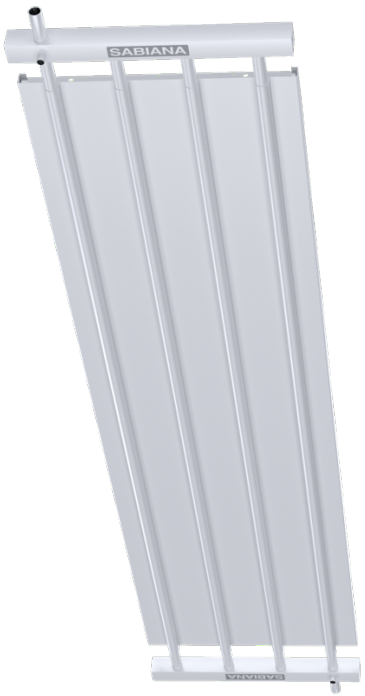
Product name: Radiant panel - Duck Strip 4.1

Product identification: Hydronic Radiant Panel defined as free hanging pre-fabricated ceiling mounted radiant panels with an air gap between construction and the emitter (not embedded) to be fed with water at temperatures below 120 °C intended to be installed in buildings, according to EN 14037-1-2016.

Geographical scope: A1-A2 Global, A3 Italian, A4-A5, C European

HS Code: 73221900 - Iron radiators for heating systems

Product description: Radiant panels are static heating elements in the form of profiled strips made of steel sheet with welded in pipes. It is intended to be connected to an heat source, such as boilers, heat pumps or solar panels.
The hot water flowing into the Radiant Panels, heats the pipes and the radiant surface. These tempered areas emit energy in form of heat radiation.



The present EPD covers all models of Duck Strip radiant panel shown in the following table and it is applicable to all possible configurations.

The model defines the width, number of tubes and tube diameter).

Model	
Standard	Special
DS-ST18-3-030	-
DS-ST18-3-060	-
DS-ST18-3-090	**-**
DS-ST18-3-120	-
DS-ST18-3-150	-
DS-ST18-4-030	-
DS-ST18-4-060	-
DS-ST18-4-090	-
DS-ST18-4-120	-
DS-ST28-2-030	DS-SP28-2-030
DS-ST28-2-045	DS-SP28-2-045
DS-ST28-2-060	DS-SP28-2-060
DS-ST28-2-075	DS-SP28-2-075
DS-ST28-2-090	DS-SP28-2-090
DS-ST28-2-105	DS-SP28-2-105
DS-ST28-2-120	DS-SP28-2-120
DS-ST28-2-135	DS-SP28-2-135
DS-ST28-2-150	DS-SP28-2-150

According to the General Programme Instruction (GPI) v. 4.0 and the PCR 2019:14 "Construction products" v.1.3.4, the results for each category of impact are represented for the configuration DS-ST18-3-090, identified as representative. This configuration is the model of the Duck Strip family with the highest sales volumes.
This configuration consists of a 6 m long shell, 2 collectors and a fiberglass insulation panel (total weight: 81,08 kg).

Packaging: Radiant panels are sold on wooden pallets with wooden spacers and wrapped in plastic film.

Technical data

The following table shows the weights to calculate the total weight of the radiant panel depending on the model and length.

All other information and technical characteristics are available in the product technical manual downloadable from the company website, www.sabiana.it.

Radiant panel and header

MODEL		Radiant panel		Header
		Weight (empty) kg/m		Weight (empty) kg
Standard	Special	Standard	Special	
DS-ST18-3-030	-	4	-	1
DS-ST18-3-060	-	8	-	2
DS-ST18-3-090	-	**12**	**-**	**2,9**
DS-ST18-3-120	-	16	-	3,8
DS-ST18-3-150	-	19	-	4,7
DS-ST18-4-030	-	5	-	1
DS-ST18-4-060	-	9	-	2
DS-ST18-4-090	-	14	-	2,9
DS-ST18-4-120	-	18	-	3,8
DS-ST28-2-030	DS-SP28-2-030	6	6,6	1
DS-ST28-2-045	DS-SP28-2-045	9	9,9	1,5
DS-ST28-2-060	DS-SP28-2-060	11	12,2	2
DS-ST28-2-075	DS-SP28-2-075	14	15,5	2,4
DS-ST28-2-090	DS-SP28-2-090	16	17,8	2,9
DS-ST28-2-105	DS-SP28-2-105	19	21,1	3,3
DS-ST28-2-120	DS-SP28-2-120	22	24,4	3,8
DS-ST28-2-135	DS-SP28-2-135	24	26,7	4,3
DS-ST28-2-150	DS-SP28-2-150	27	30	4,7

Fiberglass insulation

H mm	L mm	Specific weight kg/m^3	Weight kg/m
30	300	20	0,18
	450		0,27
	600		0,36
	750		0,45
	900		0,54
	1050		0,63
	1200		0,72
	1350		0,81
	1500		0,9

40	300	25	0,3
	450		0,45
	600		0,6
	750		0,75
	900		0,9
	1050		1,05
	1200		1,2
	1350		1,35
	1500		1,5

Content information

Product components	Weight, kg	Post-consumer recycled material, weight-%	Pre-consumer recycled material, weight-%	Total recycled material, weight-%	Biogenic material, weight-% and kg C/kg
Steel	0,9612	0	0	0	0 resp. 0
Fiberglass	0,0386	0	0	0	0 resp. 0
Powder paint	0,0185	0	0	0	0 resp. 0
Solder	0,0004	0	0	0	0 resp. 0
PE-LD	0,0002	0	0	0	0 resp. 0
TOTAL	**1**	**0**	**0**	**0**	**0 resp. 0**

Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Wood (spacers)	0,0699	0,09	0 resp. 0
Wood (pallet)	0,0452	0,06	0 resp. 0
LDPE	0,0219	0,03	0 resp. 0
TOTAL	**0,1371**	**0,17**	**0 resp. 0**

Data referred to a single unit of the representative product Duck Strip DS-ST18-3-090. Note: The share of biobased/recycled material is unknown so, in accordance with PCR 2019:14 v.1.3.4, this part of the content declaration is declared as 0% (a conservative estimate)

The ranges of products from Sabiana Spa comply with the requirements of the "RoHS" Directive (EU) 2015/863 of 31 March 2015 and 2011/65/EU of 8 June 2011.
Sabiana S.p.A fulfils the requirements of “Regulation (EC) No 1907/2006 - Registration, Evaluation, Authorisation and Restriction Chemicals (REACH)”. Detailed declaration of the SVHC substances that may be present above a concentration of 0.1% (w/w) in the individual articles is available.

LCA information

Methodology: The quantification of the environmental performance was carried out in accordance with the Life Cycle Assessment (LCA - Life Cycle Assessment) methodology regulated by the ISO 14040, ISO 14044 and ISO 14025 standards and following the specific product requirements PCR 2019: 14 Construction Products Version 1.3.4.
The LCA methodology allows you to determine the environmental impacts of a product or service in terms of resource consumption and emissions into the environment, as well as waste production, from a life cycle perspective.

Declared unit: The declared unit is 1 kg of radiant panel.

Time representativeness: The LCA study is conducted in 2024 with data relating to 2023.

Database and LCA software: The Ecoinvent database v.3.10 (www.ecoinvent.org) provides the life cycle inventory data for the raw and process materials obtained from the background system. LCA software used is SimaPro 9.6.

Environmental impact method: EN 15804 + A2 based on EF 3.1 characterisation factors (JRC Website)

Description of the system boundaries: Cradle to gate with options (A1-A3, A4-A5, C1-C4, D).

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage			Use stage							End of life stage			Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
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	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	IT	EU	EU	-	-	-	-	-	-	-	EU	EU	EU	EU	EU
Specific data used	>60%				-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	<10%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

X=Declared module, ND= Non declared, EU=European, GLO=Global, IT=Italy.

Cut-off rules: 1% cut-off is applied. According to PCR 2019:14 v.1.3.4, data for elementary flows to and from the product system contributing to a minimum of 99% of the declared environmental impacts have been included.

Quality data: Specific data are used for raw materials, electricity, fuel data, emissions, waste data, average distances and means of transport in modules A2 and A4.
Selected generic data derived from the Ecoinvent v.3.10 database are used for the

following phases: production of raw materials, fuels and electricity.
Proxy data do not contribute to the potential environmental impacts by more than 10% for each impact category.

Allocation rules: No allocation was made in the A1-A2 modules. The materials and weights were extracted from the BoM of the specific configuration. For each material, the type of packaging with which it arrives at the Sabiana plant has been identified and the amount of packaging allocated to the individual material has been calculated. Raw material transports were calculated based on manufacturer/supplier distances.
For module A3 an allocation was made based on the number of pieces to determine the specific consumes of a single radiant panel.

Life Cycle Stages

A1, raw material supply. This module 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 and boat transportations of each raw material. For each component/material, the distance from the production country to the Sabiana plant has been calculated. For non-European materials, the transportation from the production plants to the port of origin has been deemed irrelevant compared to the distance that the product needs to travel by ship.

A3, manufacturing. This module includes the manufacture/assembling of product at the Sabiana' plant 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.
The 11,7% of the electricity used for the production of the Duck Strip radiant panel at Sabiana plant is self-produced by photovoltaic panels. The remaining amount of electricity is supplied by the national grid. The electrical mix used to model the electrical consumption at medium voltage is based on the Italian Residual Mix 2023 (Source: AIB, "European Residual Mixes -Results of the calculation of Residual Mixes for the calendar year 2023", 642 gCO_2eq/kWh).

The end-of-life scenario for raw material packaging was modelled according to CONAI 2023 data (Italian Packaging Consortium).

A4, transport to the building site. This module includes transport from the production gate to the installation site. The average distribution distance is calculated based on the sales of the Duck Strip radiant panel in the year 2023. Specifically, the following distribution is considered: 11% of the product is sold in Italy and 89% in other European countries (it was considered the specific distance for each state). Shipments to Italy and Europe took place by truck, with some distances also covered by train (for the United Kingdom).

A5, installation into the building. This module includes all material and energy inputs and outputs required for the installation of the radiant panel. Installation is manual without the use of energy and/or materials. Specifically, this module includes only the end of life of the product packaging. The end-of-life scenario for packaging was modelled for an European scenario according to the PCR Part A for Building-Related Products and Services v.4 of UL Environment framework.

C1 - de-construction. This stage includes the impacts during the dismantling of the Duck Strip radiant panel from the building. It is assumed that no energy and additional material are needed for the dismantling of the product. This module has a contribution of 0 to all environmental indicators

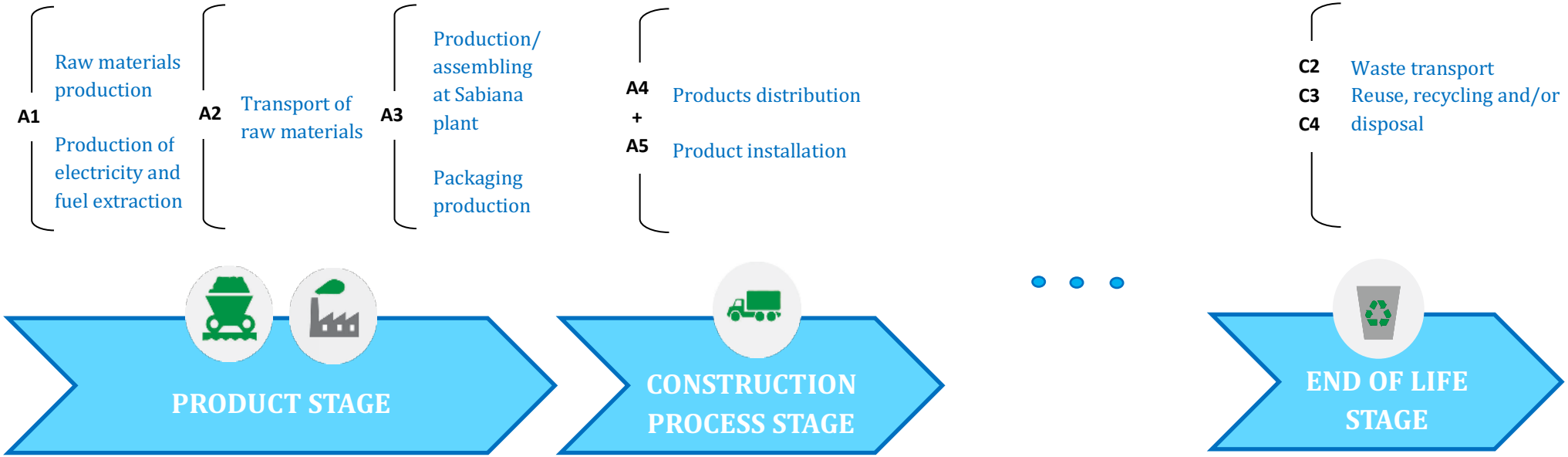
.

C2, waste transport. This stage includes the transport by road to local waste sites from the installation site. A distance of 50 km is assumed.

C3, waste processing. This module includes the collection of waste fractions from the deconstruction and waste processing of material flows intended for reuse, recycling and energy recovery. For Europe, a steel recycling rate of 88% is assumed, according to the European Steel Association (EUROFER). It is assumed that the plastic materials are not removed from the radiant panel when it is sent for recycling.

C4, waste disposal. Waste disposal including physical pre-treatment and management of the disposal site. According to EUROFER, for Europe it is assumed that 12% of steel is sent to landfill (same quantity for plastic materials which are assumed not to be separated from steel). 100% of fiberglass insulation is landfilled.

D, reuse, recycling and energy recovery potentials. Meterials that are recycled are assumed to substitute the use of virgin metals. Benefits of heat recovery from the incineration are excluded.



Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804

Results referred to 1 kg of radiant panel									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	3,21E+00	1,57E-01	1,67E-02	0	9,89E-03	1,49E-02	6,61E-04	-1,21E+00
GWP-biogenic	kg CO_2 eq.	-5,77E-02	5,16E-05	1,72E-01	0	3,21E-06	5,71E-02	3,96E-03	-2,38E-01
GWP-luluc	kg CO_2 eq.	4,31E-03	3,87E-06	1,06E-07	0	2,41E-07	8,90E-06	6,07E-08	-8,12E-04
GWP-total	kg CO_2 eq.	3,16E+00	1,58E-01	1,89E-01	0	9,89E-03	7,20E-02	4,62E-03	-1,45E+00
ODP	kg CFC 11 eq.	3,39E-08	3,21E-09	5,72E-11	0	2,00E-10	8,54E-11	1,62E-11	-8,26E-09
AP	mol H^+ eq.	1,08E-02	3,92E-04	1,00E-05	0	2,37E-05	3,71E-05	6,89E-06	-4,21E-03
EP-freshwater	kg P eq.	1,48E-04	1,32E-07	5,62E-09	0	8,21E-09	5,22E-07	1,24E-08	-6,08E-05
EP-marine	kg N eq.	2,21E-03	1,50E-04	5,81E-06	0	8,97E-06	2,45E-05	2,30E-06	-9,68E-04
EP-terrestrial	mol N eq.	2,55E-02	1,64E-03	4,68E-05	0	9,83E-05	1,35E-04	2,50E-05	-1,12E-02
POCP	kg NMVOC eq.	9,84E-03	6,83E-04	1,92E-05	0	4,15E-05	4,53E-05	8,27E-06	-4,20E-03
ADP-minerals&metals*	kg Sb eq.	1,01E-05	5,20E-09	4,28E-10	0	3,24E-10	4,17E-10	1,12E-10	-1,00E-06
ADP-fossil*	MJ	1,82E+01	2,11E-02	9,92E-04	0	1,30E-03	4,92E-02	5,58E-04	-9,19E+00
WDP*	m^3 eq	1,13E+00	8,82E-04	-4,74E-04	0	5,49E-05	-4,77E-04	-5,05E-03	-3,05E-01
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption								

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Additional mandatory and voluntary impact category indicators

Results referred to 1 kg of radiant panel									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[2]	kg CO_2 eq.	3,22E+00	1,57E-01	2,15E-02	0	9,89E-03	2,73E-02	6,61E-04	-1,21E+00

[2] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Resource use indicators

Results referred to 1 kg of radiant panel									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE**	MJ	1,69E+00	6,47E-03	4,75E-04	0	4,01E-04	1,36E-02	1,27E-04	-4,47E-01
PERM**	MJ	2,36E+01	9,07E-04	7,62E-01	0	5,64E-05	2,22E-03	3,78E-05	-1,10E+01
PERT**	MJ	2,53E+01	7,38E-03	7,62E-01	0	4,58E-04	1,59E-02	1,64E-04	-1,15E+01
PENRE	MJ	1,82E+01	2,11E-02	9,92E-04	0	1,29E-03	4,91E-02	5,58E-04	-9,19E+00
PENRM	MJ	1,02E-02	1,02E-08	2,65E-08	0	6,35E-10	1,80E-08	6,71E-09	-8,51E-06
PENRT	MJ	1,82E+01	2,11E-02	9,92E-04	0	1,29E-03	4,91E-02	5,58E-04	-9,19E+00
SM	kg	6,50E-03	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	2,88E-02	5,34E-05	-3,94E-04	0	3,32E-06	3,42E-05	-1,09E-04	-8,39E-03
Acronyms		PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water							

*** The indicators PERE, PERM and PERT were calculated according to method B of the Annex 3 (PCR 2019:14 v.1.3.4)*

Waste indicators

Results referred to 1 kg of radiant panel									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	5,56E-03	1,53E-05	1,34E-04	0	9,53E-07	4,16E-03	4,51E-06	-3,65E-04
Non-hazardous waste disposed	kg	5,88E-02	6,18E-05	8,79E-02	0	3,85E-06	1,07E-02	1,54E-01	-1,17E-02
Radioactive waste disposed	kg	3,11E-05	2,00E-07	7,80E-09	0	1,22E-08	4,89E-07	2,66E-09	-1,03E-05

Output flow indicators

Results referred to 1 kg of radiant panel									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0	0	0	0	0	0	0	0
Material for recycling	kg	4,97E-01	0	4,48E-02	0	0	8,46E-01	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0	0	0
PENRT	MJ	0	0	0	0	0	0	0	0

References

AIB, "European Residual Mixes -Results of the calculation of Residual Mixes for the calendar year 2023"

CEN (2019) EN 15804:2012+A2:2019, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

CONAI (Consorzio Nazionale Imballaggi), 2023 (www.conai.org)

Database Ecoinvent v.3.10 (www.ecoinvent.org)

Default list v. 2.0 of environmental impact indicators: the International EPD System (www.environdec.com)

EPD International (2021) General Programme Instructions for the International EPD® System. v. 4.0, dated 2021-03-29. (www.environdec.com)

EN 14037-1:2016, Free hanging heating and cooling surfaces for water with a temperature below 120°C - Part 1: Pre-fabricated ceiling mounted radiant panels for space heating - Technical specifications and requirements

EUROFER (2023), European Steel Association www.eurofer.eu

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

ISO 14040:2021, Environmental management – Life cyce assessment – Principles and framework.

ISO 14044: 2021, Environmental management – Life cycle assessment – Requirements and guidelines.

LCA Report Sabiana – Radiant Panel - Duck strip 4.1 v.1

PCR 2019:14, Construction Products v. 1.3.4 valid until: 2025-06-20

PCR Part A for Building-Related Products and Services v.4 of UL Environment framework (www.ul.com)

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