Environmental Product Declaration

of multiple products, based on several representative products, in accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

PS-CLE hydronic cassette fan coil units with EC motor

from

PST CLIMA S.r.l.

Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
Type of EPD:	EPD of multiple products from a company
EPD registration number:	**EPD-IES-0035539:001**
Version date:	**2026-10-15**
Validity date:	**2031-10-15** *An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com*



EPD of multiple products, based on several representative products. This EPD covers all 9 models of the PS-CLE family: PS070/2R, PS090/3R, PS090/4R, PS094/2R+1, PS094/3R+1, PS150/3R, PS150/4R, PS154/2R+1, PS154/3R+1. The declared results are the production-volume weighted average of the representative products PS070/2R (smallest unit) and PS154/3R+1 (largest unit).

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:	support@environdec.com

Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): PCR 2019:14 Construction products, version 2.0.1 (2025-06-05); UN CPC 43912
PCR review was conducted by: The Technical Committee of the International EPD System. Chairs of the PCR review: Rob Rouwette (chair), Noa Meron (co-chair). The review panel may be contacted via the Secretariat, www.environdec.com/contact.
c-PCR, if applicable: c-PCR-027 Fan coils (to PCR 2019:14), version 1.0.0 (2025-04-23). c-PCR review: The Technical Committee of the International EPD System, chair Gorka Benito Alonso; the review panel may be contacted via the Secretariat.

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ Individual EPD verification without a pre-verified LCA/EPD tool Third-party verifier: Guido Croce Approved by: 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 published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit 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 identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.
For further information about comparability, see EN 15804 and ISO 14025.

INFORMATION ABOUT EPD OWNER

Owner of the EPD: PST CLIMA S.r.l.

Address: Via Pietro Candiano 8, 36016 Thiene (VI), Italy

Contact: Stefano Pistillo – direzione@pstclima.it – tel. +39 0445 540348 – www.pstclima.it

Address and contact information of the LCA practitioner commissioned by the EPD owner: Nicolò Basso, LEOALES S.r.l. Società Benefit, Strada di Casale 98, 36100 Vicenza (VI), Italy; operational office: Via Orazio Marinali 22, 36061 Bassano del Grappa (VI), Italy – n.basso@leoales.com

Description of the organisation: PST CLIMA is an Italian company founded in 2016 that designs, develops and manufactures hydronic heating and cooling systems for residential, commercial, public and industrial buildings. The company grew out of a family experience in the maintenance of HVAC systems and has developed specific skills in the design and production of hydronic terminal units. Design, development and production are carried out in-house at the plant in Thiene (Vicenza, Italy), which allows PST CLIMA to control every step of the process and the compliance of the products with their technical specifications.

The range includes both standard products and units developed for specific applications, adapted to different installation and operating conditions. The products are designed and made entirely in Italy and are sold on the Italian market and abroad, also to other brands as a contract manufacturer. The company's growth is supported by investments in production capacity, process optimisation and new products and markets, with particular attention to energy efficiency and to the environmental aspects of the hydronic systems it designs and manufactures.

Name and location of production site: PST CLIMA S.r.l., Via Pietro Candiano 8, Thiene (VI), Italy

PRODUCT INFORMATION

Product name: PS-CLE hydronic cassette fan coil units with EC motor

Product identification: PS-CLE family, 9 models identified by the PST CLIMA product codes listed in Table 1; product standard EN 1397 (hydronic room fan coil units).

UN CPC code: 43912 – Air-conditioning machines (subset covered by c-PCR-027 Fan coils)

Other codes for product classification: HS 8415.83 – air conditioning machines containing a motor-driven fan, not incorporating a refrigerating unit

Reference service life: 20 years (c-PCR-027)

Visual representation of the product:



PS-CLE units installed in a false ceiling with 600 mm module

Product description: PS-CLE units are hydronic fan coil units of the cassette type, installed in false ceilings, for cooling and heating of rooms in residential, commercial and public buildings. They are supplied with chilled or hot water from an external generator (chiller, heat pump or boiler); they contain no refrigerant and do not use water in operation. The range includes two modular sizes for standard ceiling grids, 600×600 mm (single units, PS070–PS094) and 1200×600 mm (double units, PS150–PS154), in 2-pipe (2, 3 or 4 rows) and 4-pipe (2+1 and 3+1 rows) versions. Each unit consists of:

- galvanised steel casing, internally insulated with anti-condensation and sound-absorbing material;
- folded coil heat exchanger with hydrophilic aluminium fins and copper tubes;
- external-rotor fan with radial impeller and electronically commutated (EC) motor;
- ABS diffuser panel (RAL 9003) and G3 washable air filter;
- condensate drain kit with centrifugal pump and float switch; terminal board with fuse.

The units influence the operational energy use of the building through the electricity absorbed by the EC fan (module B6); the thermal energy itself is produced outside the system boundary. There are no restrictions on the type of building, apart from the presence of a false ceiling with a 600 mm module.

Manufacturing. PST CLIMA assembles purchased components (sheet-metal parts, coils, EC motors, condensate pumps, electronic boards, ABS panels) by hand, then tests and packs the units. No thermal processes, painting or machining take place at the plant, which is heated by heat pumps and uses no fossil fuels. Electricity comes from the grid and from an on-site photovoltaic plant.

Products covered by the EPD (EPD of multiple products)

The EPD covers all models of the PS-CLE family. It is an **EPD of multiple products, based on several representative products** (PCR 2019:14 §4.10.1): the declared results are the production-volume weighted average of two representative products, the smallest model, PS070/2R, and the largest model, PS154/3R+1 (2025 production volumes weights 88.74% and 11.26%). The choice is justified by the production volumes (PS070/2R is the best-selling model) and by the fact that the two models cover the extremes of size and mass of the family. All models share the same materials, components, suppliers and manual assembly process; they differ in casing size, hydraulic version and number of coil rows.

Table 1 – Products covered by the EPD (PS-CLE family) and 2025 production volumes

Product code	Module size [mm]	Hydraulic version	Coil rows
PS070/2R	600×600	2-pipe	2 rows
PS090/3R	600×600	2-pipe	3 rows
PS090/4R	600×600	2-pipe	4 rows
PS094/2R+1	600×600	4-pipe	2+1 rows
PS094/3R+1	600×600	4-pipe	3+1 rows
PS150/3R	1200×600	2-pipe	3 rows
PS150/4R	1200×600	2-pipe	4 rows
PS154/2R+1	1200×600	4-pipe	2+1 rows
PS154/3R+1	1200×600	4-pipe	3+1 rows
Total PS-CLE			

Technical data of the representative products (c-PCR-027 §5.4.6)

Parameter	Unit	PS070/2R	PS154/3R+1
Dimensions of the unit (L × W × H)	mm	570 × 570 × 250	1170 × 570 × 250
Dimensions of the panel	mm	620 × 620 × 30	1220 × 620 × 30
Weight (without packaging, incl. panel)	kg	18.10	34.70
Air flow (high / medium / low speed)	m³/h	980 / 590 / 250	1620 / 1350 / 820
P(c) high / med / low – total cooling capacity	kW	4.32 / 2.88 / 1.27	11.20 / 9.75 / 6.43
Pe(c) high / med / low – electrical power input, cooling	kW	0.041 / 0.019 / 0.009	0.085 / 0.037 / 0.019
P(h) high / med / low – total heating capacity	kW	5.85 / 3.96 / 1.94	12.54 / 11.12 / 7.80
Pe(h) high / med / low – electrical power input, heating	kW	0.041 / 0.019 / 0.009	0.085 / 0.037 / 0.019
Pstby – stand-by electrical power input	kW	0	0
Components with stand-by consumption	–	None (no component is powered when the unit is off)	None (no component is powered when the unit is off)
Total electricity use in B6 over 20 years	kWh	692.5	1 413.7

References to relevant websites for more information: www.pstclima.it

CONTENT DECLARATION

The content declaration refers to the **declared product**, i.e. the production-volume weighted average of the representative products PS070/2R (weight 88.74%) and PS154/3R+1 (weight 11.26%), per unit of product: mass **19.97 kg** without packaging. The range between the two representative products, which covers the range of the PS-CLE family, is given for information (PCR 2019:14 §4.10.1).

Table 2 – Content of the declared product (per unit, without packaging)

Product content	Mass, kg	Mass-% of product	Range PS070–PS154, kg	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C/product
Galvanised steel (casing, brackets, frames)	8.73	43.7%	7.9–15.3	0	0	0
Copper – coil tubes	1.70	8.5%	1.4–4.1	0	0	0
Aluminium – coil fins	1.43	7.1%	1.2–3.2	0	0	0
EC motor (steel 45%, copper 30%, aluminium 25%)	2.94	14.7%	2.7–4.8	0	0	0
ABS – diffuser panel	1.87	9.4%	1.7–3.2	0	0	0
Polypropylene (drain trays, fittings, insulation)	1.61	8.1%	1.6–1.7	0	0	0
Condensate pump (steel 60%, copper 40%)	0.50	2.5%	0.5–0.5	0	0	0
Air filter (steel 50%, polypropylene 50%)	0.33	1.7%	0.3–0.6	0	0	0
Copper – internal wiring	0.22	1.1%	0.2–0.4	0	0	0
Screws and fasteners (steel 50%, aluminium 50%)	0.21	1.1%	0.2–0.3	0	0	0
Electronic board / terminal board	0.20	1.0%	0.2–0.2	0	0	0
Polyamide 6 (cable glands, clips)	0.11	0.6%	0.1–0.2	0	0	0
Polyethylene / PVC / rubber (cables, hoses)	0.11	0.6%	0.1–0.2	0	0	0
TOTAL	**19.97**	**100%**	**18.1–34.7**	**0**	**0**	**0**

Content by material: ferrous metals 10.63 kg; copper 3.01 kg; aluminium 2.27 kg; plastics 3.87 kg; electronics 0.20 kg. The share of post-consumer recycled material is not documented by the suppliers and is therefore declared as 0% (conservative estimate). The product contains no biogenic material.

Table 3 – Content of the packaging (per unit of declared product)

Packaging materials	Mass, kg	Mass-% (versus the product)	Range PS070–PS154, kg	Biogenic material, kg C/product
Cardboard box of the unit	1.524	7.6%	1.400–2.500	0.625
Cardboard box of the panel	0.612	3.1%	0.550–1.100	0.251
Wooden pallet (share per unit; 10 or 5 units per pallet)	2.781	13.9%	2.500–5.000	1.182
LLDPE stretch film (share per unit)	0.009	0.0%	0.008–0.016	0.000
TOTAL	**4.926**	**24.7%**	**4.46–8.62**	**2.058**

Biogenic carbon content: cardboard 0.410 kg C/kg (90% dry matter, 46% carbon, 1% fossil) and wood 0.425 kg C/kg (85% dry matter, 50% carbon), IPCC 2006 Guidelines, Vol. 5, Table 2.4, and EN 16449. The packaging is 99.8% biogenic by mass. Recycled content of the packaging: not declared. 1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO2.

Substances of very high concern: No substances included in the Candidate List of Substances of Very High Concern (SVHC) for authorisation under the REACH Regulation are present in the products

covered by this EPD above 0.1% of the weight of the product or of any of its components (declaration of PST CLIMA based on supplier information).

LCA INFORMATION

Functional unit: 1 kWh of thermal energy exchanged with the air of the room in cooling and/or heating mode by a hydronic fan coil unit (EN 1397), at EN 1397 standard rating conditions, over the reference service life (c-PCR-027 §4.1).

Reference flow: 1/156 433.4 of the declared product, i.e. 1.277E-04 kg of product (without packaging) per kWh. The declared product supplies 156 433.4 kWh of thermal energy in 20 years (56 186.4 kWh in cooling and 100 247.0 kWh in heating).

Conversion factor to mass: mass of the declared product 19.97 kg per unit. Results per unit of declared product = results per FU × 156 433.4; results per kg of product = results per FU × 7 833.8.

Reference service life: 20 years (c-PCR-027), equal to the technical lifespan declared by PST CLIMA.

Time representativeness: manufacturing data (energy, waste, production volumes) for the calendar year 2025 (data collection period: 1 year); bill of materials, weights and supplier distances collected in 2026; ecoinvent v3.11 background data.

Geographical scope: A1: global and European supply (GLO, RER); A2: Italy and France; A3: Italy (Thiene); A4, B6 and C: European markets of the product (Italy 50%, Finland 20%, Norway 10%, Denmark 10%, other EU countries 10%). Geographical scope of the EPD: Europe.

Database(s) and LCA software used: ecoinvent v3.11, system model “EN 15804” (cut-off); SimaPro 10 (PRé Sustainability).

EPD/LCA Tool used: not used (individual EPD verification).

Characterisation methods: EN 15804 reference package as implemented in SimaPro (“EN 15804 +A2 LCIA & LCI indicators V1.01 / EN 15804 official”), version EF 3.1; GWP-GHG according to PCR 2019:14 §4.9.

Description of system boundaries: Cradle to grave and module D (A + B + C + D): A1–A3, A4–A5, B1–B7, C1–C4 and D. No life-cycle stage is excluded; module B6 is included, as the product uses energy in the use stage.

Process flow diagram:

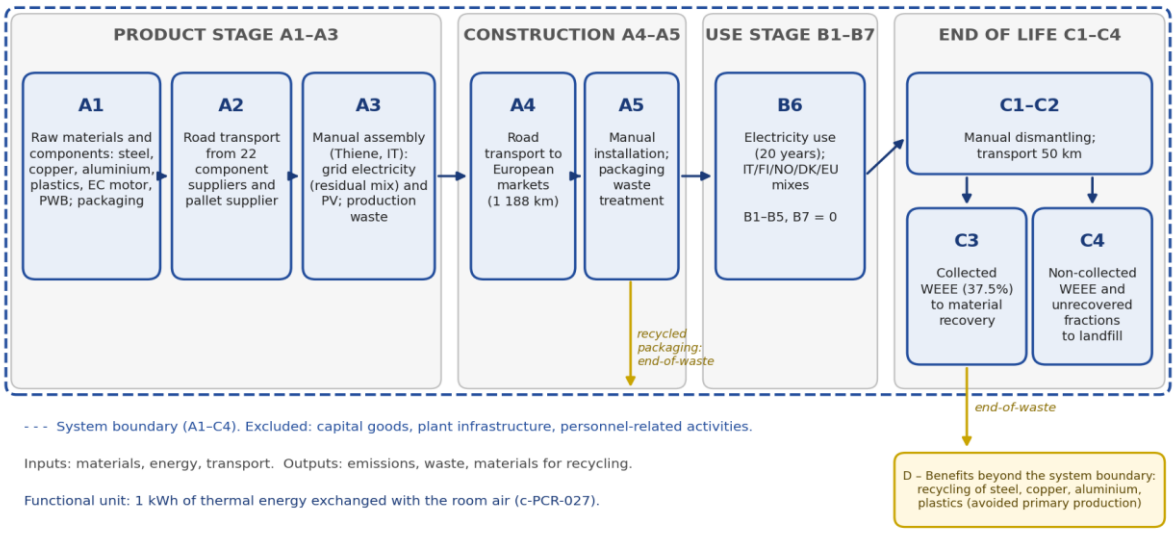


Figure 1 – Process flow diagram and system boundary

Representative products and variation

Variation of GWP-GHG (A1–A3) between the declared result and the representative products: **+17% / −38%** (PS070/2R / PS154/3R+1; difference versus the declared result). The EPD does not claim compliance with ISO 21930; variations above 10% are therefore allowed and are declared in Table 4 for all impact indicators (sum of modules A–C).

Table 4 – Variation of the impact indicator results of the representative products versus the declared results

LCA result of the representative products versus the declared result (A–C)	Unit	Min (%) – PS154/3R+1	Max (%) – PS070/2R
GWP-fossil	**kg CO_2 eq.**	−36%	+16%
GWP-biogenic	**kg CO_2 eq.**	−37%	+17%
GWP-luluc	**kg CO_2 eq.**	**−34%**	**+15%**
GWP-total	**kg CO_2 eq.**	**−36%**	**+16%**
ODP	**kg CFC 11 eq.**	**−37%**	**+17%**
AP	**mol H^+ eq.**	**−31%**	**+14%**
EP-freshwater	**kg P eq.**	**−32%**	**+15%**
EP- marine	**kg N eq.**	**−35%**	**+16%**
EP-terrestrial	**mol N eq.**	**−34%**	**+15%**
POCP	**kg NMVOC eq.**	**−35%**	**+16%**
ADP-minerals&metals*	**kg Sb eq.**	**−31%**	**+14%**
ADP-fossil*	**MJ**	**−36%**	**+16%**
WDP*	**m^3**	**−34%**	**+15%**
GWP-GHG	**kg CO2 eq.**	**−36%**	**+16%**
PM	**disease incidence**	**−34%**	**+16%**
IRP	**kBq U235 eq.**	**−35%**	**+16%**
ETP-fw	**CTUe**	**−33%**	**+15%**
HTP-c	**CTUh**	**−31%**	**+14%**
HTP-nc	**CTUh**	**−29%**	**+13%**
SQP	**dimensionless**	**−34%**	**+16%**

Explanation of the variation. Per functional unit the smallest model has the highest impacts, because it supplies less thermal energy per kg of material (A1–A3) and per kWh of electricity (B6): the mass intensity is 1.49E-04 kg/kWh for PS070/2R and 7.98E-05 kg/kWh for PS154/3R+1, the electricity intensity 5.72E-03 and 3.25E-03 kWh/kWh respectively. As both drivers act on all indicators, the variation is similar for all of them. GWP results of the representative products are reported for information in the environmental performance section.

Modules declared, geographical scope, share of primary data and data variation

	Product stage			Distribution/ installation stage		Use stage							End-of-life stage				Beyond product life cycle
	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	X	X	X	X	X	X	X	X	X	X	X	X
Geography	GLO, RER	IT, FR	IT	EU*	EU*	EU*	EU*	EU*	EU*	EU*	EU*	EU*	EU*	EU*	EU*	EU*	EU*
Share of primary data	2.4%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	+17% / −38%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Not relevant (one site)			-	-	-	-	-	-	-	-	-	-	-	-	-	-

*X = module declared. * EU = European markets of the product: Italy 50%, Finland 20%, Norway 10%, Denmark 10%, other EU countries 10% (A4, B6, C1–C4); module D: EU and GLO avoided materials. Modules B1–B5, B7 and C1 are declared with value 0: no emissions in use, no maintenance other than manual cleaning of the washable filter, no repair or replacement in 20 years of normal use, no operational water use, manual dismantling. Share of primary data and variation refer to GWP-GHG A1–A3.*

Description of the life-cycle stages and main assumptions

A1 – Raw material supply. Extraction and production of the raw materials and purchased components of the fan coil unit (steel and galvanised steel sheet, copper, aluminium, plastics, EC motor, condensate pump, electronic board) and of the packaging.

A2 – Transport. Road transport of materials and components from the direct suppliers, located mainly in Italy, to the plant in Thiene, based on the actual supplier locations.

A3 – Manufacturing. Manual assembly, testing and packing at the plant in Thiene, including the electricity taken from the grid and from the on-site photovoltaic plant and the treatment of production waste up to the end-of-waste state. The plant is heated by heat pumps and uses no fossil fuels.

A4 – Transport to the building site. Road transport to the installation sites in the European markets of the product (Italy 50%, Finland 20%, Norway 10%, Denmark 10%, other EU countries 10%); weighted average distance 1 188 km.

A5 – Installation. Manual installation without energy use or ancillary materials, including the end of life of the packaging: cardboard 87% and plastic film 42% to recycling, wood 37.7% to incineration, the rest to landfill (Eurostat 2023). The biogenic carbon of the packaging leaves the system in A5.

B1–B5, B7. No relevant emissions in use; no maintenance other than manual cleaning of the washable filter; no repair, replacement or refurbishment during 20 years of normal use; no operational water use. These modules are declared with value 0.

B6 – Operational energy use. Electricity consumed by the EC fan, calculated with the formula of c-PCR-027 with 1 100 h/year in cooling (65% low, 30% medium, 5% high speed) and 1 500 h/year in heating (70% low, 25% medium, 5% high speed) over 20 years, plus the condensate pump: 773.7 kWh for the declared product. Stand-by consumption is zero. Country-specific electricity mixes of the markets are used (Italy 50%, Finland 20%, Norway 10%, Denmark 10%, EU 10%); the weighted climate impact of the electricity is 0.283 kg CO2 eq./kWh (GWP-GHG).

C1 – De-construction. Manual dismantling, without energy or materials.

C2 – Transport. 50 km by road to the waste treatment plant.

C3 – Waste processing. 37.5% of the product is collected as WEEE (EU collection rate 2023, Eurostat) and treated up to the end-of-waste state, with recycling yields of 62% for steel, 69% for aluminium and 70% for copper (JRC; EuRIC), 17% for plastics (JRC).

C4 – Disposal. The non-collected share (62.5%) and the unrecovered fractions of the collected WEEE are landfilled.

D – Benefits beyond the system boundary. Net flows of recycled steel, copper, aluminium and plastics replacing primary production (no secondary material is used in A1). Energy recovery and the electronic board are not credited.

Cut-off rules, allocation and capital goods

Cut-off criteria according to EN 15804 and PCR 2019:14: in case of insufficient data, flows below 1% of primary energy and 1% of mass of a unit process may be excluded, with a maximum of 5% per module. Only the adhesives used in assembly, estimated below 1% of the mass, were excluded.

Allocation is avoided when possible. Electricity and production waste, known only at plant level, are allocated to the product per unit produced (physical allocation, ISO 14044), as assembly is manual and largely independent of the unit size; no co-products are generated. End-of-life allocation follows the polluter-pays principle and the cut-off approach of EN 15804; the net benefits of recycling are declared in module D. Capital goods, plant infrastructure and personnel-related activities (e.g. commuting) are not included.

Energy information

Module A3: grid electricity is modelled with the Italian residual mix (market-based approach, no contractual instruments used), 0.683 kg CO2 eq./kWh (GWP-GHG); self-consumed photovoltaic electricity (no guarantees of origin sold), 0.0835 kg CO2 eq./kWh. Module B6: see the description of the life-cycle stages.

Data collection and data quality

Site-specific data were collected at the PST CLIMA plant in Thiene for manufacturing (A3), for the year 2025 (data collection period: one year), and for the bill of materials, the suppliers and the transport distances (A1–A2) in 2026. Upstream and downstream processes are modelled with generic data from the ecoinvent v3.11 database; purchased components without supplier data (EC motor, condensate pump, electronic board) are modelled by material composition. The use stage and the end-of-life scenarios reflect the European markets of the product.

The quality of the data was assessed according to EN 15941 and EN 15804 Annex E (PEF data quality scheme). The overall data quality is **good** (data quality rating 2.05): excellent for the manufacturing

data, very good for transport and for the electricity of the use stage, good for materials, components and end of life. No poor or very poor quality data were identified among the relevant datasets.

Table 5 – Data quality

Data	Modules	Data category	Data quality level
Materials, components and packaging	A1	Secondary	Good
Transport (suppliers, distribution, end of life)	A2, A4, C2	Primary and secondary	Very good
Manufacturing (electricity, production waste)	A3	Primary	Excellent
Packaging waste at the building site	A5	Secondary (scenario)	Good
Electricity in the use stage	B6	Secondary (scenario)	Very good
End-of-life treatment and disposal	C3, C4	Secondary (scenario)	Good
Overall (weighted on GWP-GHG)	**A–C**		**Good**

Data sources, reference years and share of primary data

Table 6 – Data sources, reference years, data categories and share of primary data

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Raw materials, components and packaging (A1)	Database	ecoinvent v3.11	2024–2025	Secondary data	0%
Transport of materials and components (A2)	Collected data, database	EPD owner; ecoinvent v3.11	2026	Primary data	0.3%
Manufacturing: electricity and production waste (A3)	Collected data, database	EPD owner; ecoinvent v3.11	2025	Primary data	2.1%
Total share of primary data, of GWP-GHG results for A1-A3					2.4%

Contribution to the GWP-GHG results of A1–A3: A1 97.6%, A2 0.3%, A3 2.1%. The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

Additional information on the LCA

Biogenic carbon. GWP-biogenic and GWP-GHG were calculated according to PCR 2019:14 §4.9 and Annex 2. The biogenic carbon content of the packaging is reported as uptake in A1–A3 and as emission in A5; it is not balanced out in A1–A3.

Primary energy used as raw material. PERM and PENRM were calculated with option A of PCR 2019:14 Annex 3; the recovered energy leaving the system in A5 or C is not balanced out in A1–A3.

Uncertainty. A Monte Carlo analysis of the background data on modules A1, A2, A3 and B6 gives 95% confidence intervals within about ±6% on GWP-total. The results are most sensitive to the electricity mix of the use stage and to the representative product (Table 4).

ENVIRONMENTAL PERFORMANCE

LCA results of the product(s) – main environmental performance results

The results are expressed per functional unit (1 kWh of thermal energy exchanged with the room air) for the declared product (production-volume weighted average of the representative products PS070/2R and PS154/3R+1). Scientific notation with two significant figures: e.g. 2.4E-03 = 0.0024. Modules A1–A3 are declared in aggregated form; results of individual modules shall not be added up into totals or sub-totals of the life-cycle stages. Values equal to 0 have been calculated to be zero. Results per unit of declared product = results per functional unit × 156 433.4.

Mandatory impact category indicators according to EN 15804

Results per functional or declared unit																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	8.9E-04	3.3E-05	6.8E-05	0	0	0	0	0	1.4E-03	0	0	1.2E-06	2.9E-06	6.9E-05	-6.9E-05
GWP-fossil	kg CO_2 eq.	9.2E-04	3.2E-05	3.8E-06	0	0	0	0	0	1.3E-03	0	0	1.2E-06	2.4E-06	1.8E-05	-6.9E-05
GWP-biogenic	kg CO_2 eq.	-4.2E-05	2.1E-08	6.4E-05	0	0	0	0	0	5.7E-05	0	0	8.0E-10	4.6E-07	5.1E-05	-1.2E-07
GWP-luluc	kg CO_2 eq.	4.2E-06	1.1E-08	5.4E-10	0	0	0	0	0	3.8E-06	0	0	4.0E-10	1.1E-09	2.7E-09	-6.9E-07
ODP	kg CFC 11 eq.	1.3E-11	7.1E-13	4.4E-14	0	0	0	0	0	3.2E-11	0	0	2.6E-14	1.4E-14	5.4E-14	-6.5E-13
AP	mol H^+ eq.	1.7E-05	1.0E-07	1.7E-08	0	0	0	0	0	6.2E-06	0	0	3.9E-09	6.2E-09	2.6E-08	-2.8E-06
EP-freshwater	kg P eq.	1.4E-06	2.2E-09	1.0E-09	0	0	0	0	0	6.0E-07	0	0	8.3E-11	4.8E-10	5.5E-09	-2.1E-07
EP-marine	kg N eq.	1.4E-06	3.5E-08	2.0E-08	0	0	0	0	0	1.0E-06	0	0	1.3E-09	2.6E-09	2.5E-07	-1.6E-07
EP-terrestrial	mol N eq.	1.7E-05	3.8E-07	7.7E-08	0	0	0	0	0	1.1E-05	0	0	1.4E-08	1.3E-08	7.2E-08	-2.1E-06
POCP	kg NMVOC eq.	5.4E-06	1.6E-07	3.5E-08	0	0	0	0	0	3.8E-06	0	0	5.9E-09	3.9E-09	3.3E-08	-6.4E-07
ADP-minerals&metals*	kg Sb eq.	2.0E-07	1.1E-10	4.8E-12	0	0	0	0	0	2.2E-08	0	0	4.1E-12	3.0E-11	2.5E-11	-3.3E-08
ADP-fossil*	MJ	1.3E-02	4.6E-04	3.8E-05	0	0	0	0	0	2.7E-02	0	0	1.7E-05	1.2E-05	4.1E-05	-8.2E-04
WDP*	m^3	5.4E-04	2.3E-06	-1.1E-07	0	0	0	0	0	1.4E-03	0	0	8.7E-08	2.7E-07	-4.9E-06	-5.1E-05
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 on these results are high or as there is limited experience with the indicator.*

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. The results of the end-of-life stage (modules C1–C4) should be considered when using the results of the product stage (modules A1–A3).

Additional mandatory and voluntary impact category indicators

Results per functional or declared unit																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	9.3E-04	3.3E-05	2.0E-05	0	0	0	0	0	1.4E-03	0	0	1.2E-06	2.9E-06	6.9E-05	-6.9E-05
PM	disease incidence	8.4E-11	2.6E-12	3.8E-13	0	0	0	0	0	2.9E-11	0	0	9.7E-14	8.5E-14	2.6E-13	-1.0E-11
IRP**	kBq U235 eq.	7.7E-05	5.5E-07	4.0E-08	0	0	0	0	0	6.3E-04	0	0	2.1E-08	1.4E-07	3.6E-07	-6.3E-06
ETP-fw*	CTUe	2.1E-02	6.1E-05	5.6E-05	0	0	0	0	0	3.8E-03	0	0	2.3E-06	1.0E-05	4.9E-04	-2.9E-03
HTP-c*	CTUh	2.1E-12	5.6E-15	1.0E-15	0	0	0	0	0	4.2E-13	0	0	2.1E-16	2.1E-15	7.0E-15	-3.4E-13
HTP-nc*	CTUh	1.5E-10	2.9E-13	5.8E-14	0	0	0	0	0	2.2E-11	0	0	1.1E-14	2.1E-13	1.3E-12	-2.7E-11
SQP*	dimensionless	9.2E-03	2.7E-04	1.2E-05	0	0	0	0	0	1.1E-02	0	0	1.0E-05	2.4E-05	6.5E-05	-8.7E-04

*PM = Potential incidence of disease due to particulate matter emissions; IRP = Potential human exposure efficiency relative to U235; ETP-fw = Potential comparative toxic unit for ecosystems; HTP-c = Potential comparative toxic unit for humans, cancer effects; HTP-nc = Potential comparative toxic unit for humans, non-cancer effects; SQP = Potential soil quality index. * 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. ** This impact category deals mainly with the eventual impact of low dose ionising radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionising radiation from the soil, from radon and from some construction materials is also not measured by this indicator.*

Resource use indicators

Results per functional or declared unit																
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1.9E-03	7.5E-06	3.1E-04	0	0	0	0	0	1.3E-02	0	0	2.8E-07	1.8E-06	5.1E-06	-3.3E-04
PERM	MJ	4.8E-04	0	-4.8E-04	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	2.4E-03	7.5E-06	-1.7E-04	0	0	0	0	0	1.3E-02	0	0	2.8E-07	1.8E-06	5.1E-06	-3.3E-04
PENRE	MJ	1.2E-02	4.6E-04	4.0E-05	0	0	0	0	0	2.7E-02	0	0	1.7E-05	1.2E-05	9.6E-04	-8.2E-04
PENRM	MJ	9.8E-04	0	-2.5E-06	0	0	0	0	0	0	0	0	0	-6.3E-05	-9.2E-04	0
PENRT	MJ	1.3E-02	4.6E-04	3.7E-05	0	0	0	0	0	2.7E-02	0	0	1.7E-05	-5.1E-05	4.1E-05	-8.2E-04

[1] 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.

SM	kg	5.7E-05	2.1E-07	1.4E-08	0	0	0	0	0	6.2E-06	0	0	7.7E-09	1.1E-08	1.7E-08	-1.8E-05
RSF	MJ	9.4E-06	2.7E-09	8.5E-11	0	0	0	0	0	4.8E-08	0	0	1.0E-10	6.5E-10	5.6E-10	-1.1E-08
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m^3	1.3E-05	5.8E-08	-2.3E-09	0	0	0	0	0	3.6E-05	0	0	2.2E-09	6.9E-09	-1.1E-07	-1.5E-06
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														

PERM and PENRM calculated with option A of PCR 2019:14 Annex 3.

Waste indicators

Results per functional or declared unit															
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	2.0E-04	6.6E-07	9.3E-08	0	0	0	0	0	6.0E-05	0	0	2.5E-08	3.8E-07	1.9E-07	-2.8E-05
Non-hazardous waste disposed	kg	6.9E-03	1.4E-05	2.4E-05	0	0	0	0	0	3.0E-03	0	0	5.3E-07	6.5E-06	2.4E-04	-8.4E-04
Radioactive waste disposed	kg	2.0E-08	1.4E-10	1.0E-11	0	0	0	0	0	1.5E-07	0	0	5.1E-12	3.5E-11	8.9E-11	-1.5E-09

Output flow indicators

Results per functional or declared unit															
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Material for recycling	kg	2.6E-05	5.5E-09	1.2E-05	0	0	0	0	0	6.5E-06	0	0	2.1E-10	2.4E-05	1.9E-05	-1.4E-07
Materials for energy recovery	kg	2.7E-09	2.9E-11	1.1E-12	0	0	0	0	0	5.3E-10	0	0	1.1E-12	1.3E-12	2.3E-12	-2.1E-10
Exported energy, electricity	MJ	7.5E-06	9.0E-08	5.8E-09	0	0	0	0	0	1.5E-04	0	0	3.4E-09	1.3E-07	1.4E-07	-1.8E-07
Exported energy, thermal	MJ	7.6E-06	1.1E-07	2.0E-09	0	0	0	0	0	1.8E-06	0	0	4.2E-09	4.7E-08	4.9E-08	-4.2E-07

Biogenic carbon content at the factory gate

Biogenic carbon content	Unit	Per unit of declared product	Per functional unit
Biogenic carbon content in product	kg C	0	0
Biogenic carbon content in accompanying packaging	kg C	2.06	1.3E-05

1 kg of biogenic carbon is equivalent to 44/12 kg of CO2.

Additional LCA results: end-of-life scenarios 100% recycling and 100% landfill

The end-of-life scenario of the main results is a mix of recycling and landfill (37.5% of the product collected as WEEE and treated for recycling, the rest landfilled). According to PCR 2019:14 §4.8.4, the corresponding 100% scenarios are declared in this subsection. Modules A1–B7 are identical to the main results and are not repeated; C1 (manual dismantling) is zero and C2 (50 km by road) is unchanged in all scenarios.

100% recycling: the whole product is collected as WEEE and sent to recycling (C3); no fraction is landfilled; module D credits the whole mass of steel, copper, aluminium and plastics. **100% landfill:** the whole product is landfilled (C4); no secondary materials are produced, so module D is zero.

Table 7 – Core environmental impact indicators of the 100% recycling and 100% landfill scenarios (modules C1–C4 and D), per functional unit

Indicator	Unit	100% recycling					100% landfill				
		C1	C2	C3	C4	D	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	0	1.2E-06	2.2E-05	0	-3.1E-04	0	1.2E-06	0	1.0E-04	0
GWP-fossil	kg CO2 eq.	0	1.2E-06	2.0E-05	0	-3.1E-04	0	1.2E-06	0	2.0E-05	0
GWP-biogenic	kg CO2 eq.	0	8.0E-10	1.9E-06	0	-4.3E-07	0	8.0E-10	0	8.1E-05	0
GWP-luluc	kg CO2 eq.	0	4.0E-10	6.3E-09	0	-2.7E-06	0	4.0E-10	0	2.3E-09	0
ODP	kg CFC 11 eq.	0	2.6E-14	8.2E-14	0	-3.9E-12	0	2.6E-14	0	6.1E-14	0
AP	mol H+ eq.	0	3.9E-09	3.4E-08	0	-1.1E-05	0	3.9E-09	0	3.1E-08	0
EP-freshwater	kg P eq.	0	8.3E-11	2.7E-09	0	-8.2E-07	0	8.3E-11	0	8.0E-09	0
EP-marine	kg N eq.	0	1.3E-09	1.6E-08	0	-6.5E-07	0	1.3E-09	0	3.9E-07	0
EP-terrestrial	mol N eq.	0	1.4E-08	7.2E-08	0	-8.4E-06	0	1.4E-08	0	9.1E-08	0
POCP	kg NMVOC eq.	0	5.9E-09	2.2E-08	0	-2.7E-06	0	5.9E-09	0	4.6E-08	0
ADP-minerals&metals	kg Sb eq.	0	4.1E-12	1.4E-10	0	-1.2E-07	0	4.1E-12	0	5.1E-12	0
ADP-fossil	MJ	0	1.7E-05	6.6E-05	0	-4.4E-03	0	1.7E-05	0	4.5E-05	0
WDP	m³ world eq. deprived	0	8.7E-08	1.9E-06	0	-2.0E-04	0	8.7E-08	0	-8.5E-06	0

Indicator abbreviations and disclaimers as in the tables of the main results. The results of the additional scenarios shall be used together with the results of modules A1–B7 of the main results.

Additional LCA results: GWP of the representative products

For information, the table reports the GWP results of the two representative products, calculated with the same model and assumptions. They are not the declared results.

Table 8 – GWP results of the representative products, per functional unit

Indicator	Unit	Modules	Declared product (weighted average)	PS070/2R	PS154/3R+1
GWP-total	kg CO2 eq./kWh	A1–A3	8.9E-04	1.0E-03	5.5E-04
GWP-total	kg CO2 eq./kWh	A–C (sum of all modules)	2.5E-03	2.9E-03	1.6E-03
GWP-GHG	kg CO2 eq./kWh	A1–A3	9.3E-04	1.1E-03	5.8E-04
GWP-GHG	kg CO2 eq./kWh	A–C (sum of all modules)	2.5E-03	2.9E-03	1.6E-03

ADDITIONAL ENVIRONMENTAL INFORMATION

Thermal and electrical energy over the reference service life (c-PCR-027)

Total thermal energy = Σ (capacity at each speed × share of hours) × hours/year × 20 years, with 1 100 h/year in cooling (5% high, 30% medium, 65% low speed) and 1 500 h/year in heating (5% high, 25% medium, 70% low speed). The same formula, applied to the electrical power inputs, gives the electricity use in B6.

Quantity (20 years)	PS070/2R	PS154/3R+1	Declared product
Thermal energy – cooling [kWh]	41 921	168 619	56 186.4
Thermal energy – heating [kWh]	79 215	266 010	100 247.0
Total thermal energy = number of functional units [kWh]	**121 136**	**434 629**	**156 433.4**
Electricity – cooling [kWh]	299.2	609.4	334.1
Electricity – heating [kWh]	393.0	804.0	439.3
Electricity – stand-by [kWh]	0	0	0
Electricity – condensate pump [kWh]	0.3	0.3	0.3
Total electricity use in B6 [kWh]	**692.5**	**1 413.7**	**773.7**
Climate impact of B6 electricity (GWP-GHG) [kg CO2 eq./kWh]			0.283

The performances used for the calculation are not certified by a third-party certification programme. Condensate pump: 5 W for about 3 hours per year (manufacturer's estimate).

Use, maintenance and end of life

The G3 air filter is washable and should be cleaned at every change of season; no replacement of components is expected during 20 years of normal use. At the end of its life, the unit shall be disposed of by delivering it to municipal collection centres, or as required by the national regulations in force at the place of installation (waste electrical and electronic equipment, Directive 2012/19/EU).

ABBREVIATIONS

All abbreviations used in the EPD are listed below; indicator abbreviations are explained below each results table.

Abbreviation	Definition
General Abbreviations	
EN	European Norm (Standard)
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
CEN	European Committee for Standardization
CPC	Central product classification
SVHC	Substances of Very High Concern
ND	Not Declared
ABS	Acrylonitrile butadiene styrene
c-PCR	Complementary Product Category Rules
DQR	Data quality rating
EC	Electronically commutated (motor)
EoW	End-of-waste
EPD	Environmental Product Declaration
EU	European Union
FU	Functional unit
GLO	Global
GWP	Global warming potential
HS	Harmonized System (WCO)
LCA	Life cycle assessment
LCI	Life cycle inventory
LCIA	Life cycle impact assessment
LLDPE	Linear low-density polyethylene
PCR	Product Category Rules
PEF	Product Environmental Footprint
PV	Photovoltaic
PWB	Printed wiring board
RER	Europe (regional geography code)
RSL	Reference service life
WEEE	Waste electrical and electronic equipment

REFERENCES

- EPD International. General Programme Instructions of the International EPD® System, version 5.0.1. www.environdec.com
- EPD International (2025). PCR 2019:14 Construction products, version 2.0.1 (2025-06-05).
- EPD International (2025). c-PCR-027 Fan coils (to PCR 2019:14), version 1.0.0 (2025-04-23).
- EN 15804:2012+A2:2019/AC:2021 – 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.
- ISO 14040:2006 and ISO 14044:2006 – Environmental management – Life cycle assessment.
- EN 15941:2024 – Sustainability of construction works – Data quality for environmental assessment of products and construction work.
- EN 1397 – Heat exchangers – Hydronic room fan coil units – Test procedures for establishing the performance.
- Commission Recommendation (EU) 2021/2279 on the use of the Environmental Footprint methods (PEF data quality scheme).
- ecoinvent Association. ecoinvent database v3.11, system model “EN 15804”.
- IPCC (2006). 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 5 Waste, Table 2.4.
- EN 16449:2014 – Wood and wood-based products – Calculation of the biogenic carbon content of wood and conversion to carbon dioxide.
- Eurostat (2025). Waste electrical and electronic equipment (env_waselee) and packaging waste by waste management operations (env_waspac), reference year 2023.
- Passarini F. et al. (2018). Material flow analysis of aluminium, copper, and iron in the EU-28. JRC Technical Reports, EUR 29220 EN.
- EuRIC (2019). Metal recycling factsheet. European Recycling Industries' Confederation.
- LEOALES S.r.l. Società Benefit (2026). LCA report – PS-CLE hydronic cassette fan coil units (EC motor). Life cycle assessment study (project report) according to EN 15804:2012+A2:2019/AC:2021, PCR 2019:14 v2.0.1 and c-PCR-027 Fan coils v1.0.0. Prepared for PST CLIMA S.r.l., Rev. 11, 2026-10-12. Confidential; available to the verifier.

VERSION HISTORY

Version 1, 2026-10-15

Original version of the EPD.

EPD
INTERNATIONAL EPD SYSTEM
www.environdec.com