ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:
THUNDER (WiSAN-P 14.1, WiSAN-P 16.1, WiSAN-P 18.1, WiSAN-P 19.1, WiSAN-P 20.1, WiSAN-P 25.2, WiSAN-P 30.2)

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-0026885:002
Version date: 2025-11-17
Revision date: 2025-11-17
Validity date: 2030-11-15
Version number: 1.0

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 a worst-case results

ECO PLATFORM EPD VERIFIED

EPD INTERNATIONAL EPD SYSTEM

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

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 (EN 15804+A2) (2.0.1), UN CPC 43913

PCR review was conducted by: The Technical Committee of the International EPD System.
See www.environdec.com for a list of members.
Review chair: Rob Rouwette (chair), Noa Meron (cochair).
The review panel may be contacted via the Secretariat www.environdec.com/contact

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: Bureau Veritas Italia S.p.A., Viale Monza, 347, 20126 Milano (MI) Accredited by: ACCREDIA - Accreditation certification N. 00031VV

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:
Clivet S.p.A.

Address:
Italy - Via Camp Lonc, 25 - Z.I. Villapaiera - 32032 Feltre (BL)

Contact and LCA practitioner:
Paolo Agnella, Sustainability & Subsidy Finance Manager, p.agnella@clivet.it

Description of the organisation:
Clivet S.p.A. is an Italian company founded in 1989 in Feltre (Belluno). It specializes in the design, manufacturing, and distribution of advanced systems for air conditioning, heating, domestic hot water, and air handling.
The company is distinguished by its focus on high energy efficiency and environmental sustainability, offering complete solutions (such as heat pumps, chillers, air handling units, Roof-Top systems, and VRF) for the residential, commercial, and industrial sectors.
Since 2016, Clivet has been part of the MIDEA group, a strategic alliance that has expanded its product portfolio and strengthened its international market presence. The company now operates as a core component of the group's MBT Climate, contributing its expertise to comprehensive HVAC solutions. Clivet operates globally while maintaining strong roots in the Italian territory.

Product-related or management system-related certifications:
Clivet S.p.A. operates with the following certified management systems:

- Quality Management System: ISO 9001:2015
- Environmental Management System: ISO 14001:2015
- Health & Safety Management System: ISO 45001: 2018

The products are manufactured in accordance with ISO 9001 quality standards.

Product information

Product name:
WiSAN-P

This EPD covers multiple products:
WiSAN-P 14.1
WiSAN-P 16.1
WiSAN-P 18.1
WiSAN-P 19.1
WiSAN-P 20.1
WiSAN-P 25.2
WiSAN-P 30.2 (worst case)

Product identification:
Air cooled reversible full inverter heat pump for outdoor installation. The product is an electric compression thermodynamic generator, designed and manufactured according to EN 378 standard.

UN CPC code: 43913

Product description:
The WiSAN-P is an air-to-water heat pump designed for heating and cooling applications in collective residential or commercial buildings. It use R290 as the refrigerant gas. This EPD covers the entire WiSAN-P range, with cooling capacities from 34.9 kW to 72.7 kW and heating capacities from 39.9 kW to 85.9 kW.
The unit is a single monoblock designed for outdoor installation.

Key functionalities include the ability to produce:
Hot water up to 75°C with external air temperatures from -5°C to 30°C.
Chilled water at 7°C with external air temperatures from -10°C to 48°C.
The manufacturing process involves the assembly of pre-fabricated components and further processing of some parts (e.g., milling, bending) at the Clivet S.p.A. production site in Villapaiera (BL), Italy. All units undergo a final testing phase to ensure correct functionality.

Name and location of production site(s):
Clivet S.p.A. Italy - Via Camp Lonc, 25 - Z.I. Villapaiera - 32032 Felltre (BL)
Websites: www.clivet.com.

Technical data

The reference service life (RSL) for this product is considered to be 22 years.

Size			14.1	16.1	18.1	19.1	20.1	25.2	30.2
Radiant panels									
Heating									
Heating capacity (EN 14511:2022)	1,8	kW	40,1	46,8	50,4	55,8	61,0	70,2	84,4
COP (EN 14511:2022)	2	-	3,92	3,71	3,81	3,78	3,73	3,91	3,74
ErP Space Heating Energy Class - AVERAGE Climate - W35	7	-	A+++	A+++	A++	A++	A++	A+++	A+++
SCOP - MEDIUM Climate - W35	9	-	4,51	4,45	4,29	4,23	4,15	4,70	4,54
ns,h - MEDIUM climate - W35	10	%	177	175	169	166	163	185	179
Cooling									
Cooling capacity (EN 14511:2022)	4,8	kW	42,6	46,8	55,6	59,7	64,7	79,9	86,1
EER (EN 14511:2022)	5	-	4,28	3,99	3,66	3,63	3,41	4,23	3,90
Water flow-rate	4	l/s	2,04	2,24	2,66	2,86	3,09	3,82	4,12
User side exchanger pressure drops	4	kPa	11,9	14,1	11,7	13,3	15,5	18,8	21,6
Terminal units									
Heating									
Heating capacity (EN 14511:2022)	3	kW	39,9	45,2	55,1	61,5	68,5	78,6	85,9
COP (EN 14511:2022)	2	-	3,11	3,08	3,19	3,13	2,92	3,14	3,01
Cooling									
Cooling capacity (EN 14511:2022)	6	kW	34,9	38,5	49,9	54,0	58,2	67,8	72,7
EER (EN 14511:2022)	5	-	2,84	2,81	2,58	2,46	2,35	2,86	2,64
SEER	9	-	5,36	5,20	4,73	4,58	4,36	5,47	5,30
ns,c	11	%	211	205	186	180	171	216	209
Water flow-rate	6	l/s	1,66	1,83	2,37	2,57	2,77	3,22	3,46
User side exchanger pressure drops	6	kPa	8,27	9,86	9,44	10,90	12,60	13,80	15,70
Radiators									
Heating									
Heating capacity (EN 14511:2022)	12	kW	37,0	42,9	47,4	51,2	55,7	65,9	76,6
COP (EN 14511:2022)	2	-	2,71	2,57	2,67	2,60	2,55	2,74	2,56
ErP Space Heating Energy Class - AVERAGE Climate - W55	7	-	A++	A++	A++	A++	A++	A++	A++
SCOP - MEDIUM Climate - W55	9	-	3,54	3,51	3,39	3,38	3,36	3,63	3,60
ns,h - MEDIUM Climate - W55	10	%	139	137	133	132	131	142	141

The Product is compliant with the ErP (Energy Related Products) European Directive. It includes the Commission delegated Regulation (EU) No 811/2013 (rated heat output ≤ 70 kW at specified reference conditions) and the Commission delegated Regulation (EU) No 813/2013 (rated heat output ≤ 400 kW at specified reference conditions)
Contains natural gas (GWP 3)

1. Entering/leaving water temperature user side 30/35 °C, Entering external exchanger air temperature 7 °C (R.H. = 85%)
2. COP (EN 14511:2022) Heating performance coefficient. Ratio between delivered heating capacitu and power input in compliance with EN 14511:2022. The overall power absorbed
   is calculed by adding the power absorbed by the compressor + the power absorbed by the fan - the percentage value of the fan to overcome external pressure drop + the power
   absorbed by the pump - the percentage value of the pump to overcome pressure drop outside + thepower absorbed by the auxiliary electrical circuit.
3. Entering/leaving water temperature user side 40/45 °C, Entering external exchanger air temperature 7 °C (R.H. = 85%)
4. Entering/leaving water temperature user side 23/18 °C, Entering external exchanger air temperature 35 °C
5. EER (EN 14511:2022) cooling performance coefficient. Ratio between delivered coolimg capacitu and power input in compliance with EN 14511:2022. The overall power absorbed is calculated by adding the power absorbed by the compressor + the powerabsorbed by the fan - the percentage value of the fan to overcome external pressure drop + the power absorbed by the pump - the percentage value of the pump to overcome presure drop outside + thepower absorbed by the auxiliary electrical circuit.
6. Entering/leaving water temperature user side 12/7 °C, Entering external exchanger air temperature 35 °C
7. Seasonal Space Heating Energy Efficiency Class according to Commission delegated Regulation (EU) No 811/2013. W = Water outlet temperature (°C)
8. The data refers to the unit operating with optimized inverter frequency
9. Data calculated in compliance with EN 14825:2022.
10. Seasonal energy efficiency in heating EN 14825:2022.
11. Seasonal energy efficiency in cooling EN 14825:2022.
12. Entering/leaving water temperature user side 50/55 °C, Entering external exchanger air temperature 7 °C (R.H. = 85%)

Constituent declaration

The mass (weight) of one unit of a product per declared unit: 1001kg (packaging included)

Content of the product: WiSAN-P 30.2 (worst case)

Categories	Materials	Mass [kg]	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C/product or declared unit
Metals	Steel	608.0	0	-	-
Metals	Electric motor	118.0	0	-	-
Metals	Copper	86.9	0	-	-
Metals	Aluminum	54.0	0	-	-
Plastics	Polyester	14.0	0	-	-
Plastics	ABS	14.0	0	-	-
Plastics	Other	13.0	0	-	-
Miscellaneous	Refrigerant	5.0	0	-	-
Electronics	Electronic Board	5.0	0	-	-
Miscellaneous	Compressor oil	4.1	0	-	-
Metals	Other	3.0	0	-	-
Cardboard	**-**	3.0	0	0.32%	1.48
Electronics	-	2.0	0	-	-
Miscellaneous	-	608.0	0	-	-
	Total	930	0	0.32%	1.48

Packaging materials	Mass [kg]	Mass-% (versus the product)	Biogenic material, kg C/ product or declared unit
Wood	57	6.1%	28.2
Metals, Steel	14	1.5%	-
TOTAL	71	7.6%	28.2

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO_2.

The product does not contain substances included in the "Candidate list of substances of very high concern (SVHC) for authorization" in a percentage greater than 0.1%

Standard LCA

Functional/Declared unit:
one unit WiSAN-P 30.2 during the 22-year reference lifetime of the product.

Reference service life:
22 years

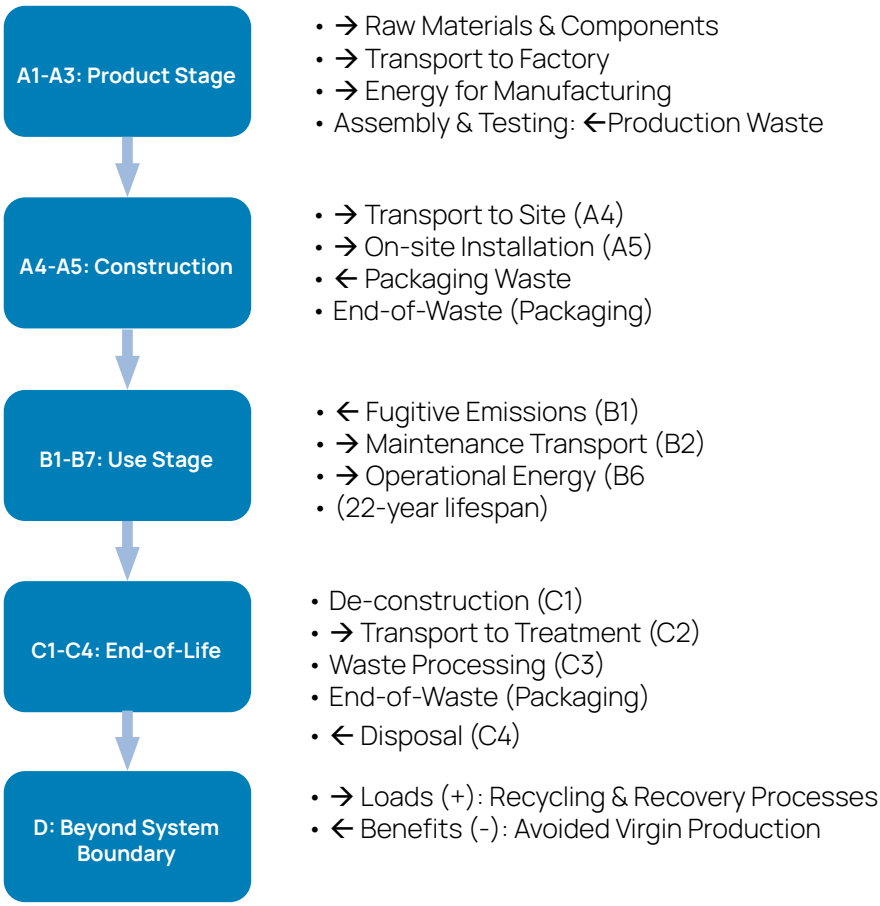
Time representativeness:
2024

Geographical scope:
Global

Database(s) and LCA software used:
Ecoinvent 3.10 - Simapro 9.6.0.1

Description of system boundaries:
Cradle to grave and module D (A + B + C + D).

Process flow diagram:



Allocation Procedures

Allocation for waste flows and end-of-life materials has been carried out following the polluter-pays principle. This is implemented using the cut-off method, where the product system is responsible for all burdens until the end-of-waste state is reached. Potential benefits from materials leaving the system for recycling or energy recovery are declared separately in Module D. No co-product allocation was necessary as no co-products with economic value are generated.

Recycled Material Input

This product does not utilize recycled materials as input. Therefore, the requirement to declare the GWP-GHG intensity of recycled inputs is not applicable.

The climate impact of the electricity mix used in the manufacturing process (Module A3) is 0.57 kg CO_2 eq./kWh (87% residual mix, 13% photovoltaic)
Modelling of Infrastructure
The production and end-of-life of capital goods (e.g., manufacturing machinery, buildings) and general infrastructure have been excluded from the system boundary .

Description of modules:

Manufacturing (A1-A3): The scenario is based raw material/semifinished product production, transport to manufacturing plant, internal rework and assembly on the final unit. It takes in consideration all the energy input and waste in the assembly line allocated based on time spent for the production.

Distribution (A4): The scenario is based on a weighted average of transport distances and modes derived from 2024 sales data for similar products, covering the Italian and European markets for an average of 456.3km for each unit.

Installation (A5): The scenario includes the transport of personnel, the use of a crane for positioning, and the end-of-life treatment of the packaging materials as all recycled.

Use (B): The use stage scenario covers a 22-year reference service life. Energy consumption (B6) is calculated according to the EN 14825 standard for an average European climate, assuming operation with the electricity mix. Maintenance (B2) includes annual transport for personnel check-ups.

End-of-Life (C): The scenario is based on default recovery and disposal rates for Electrical and Electronic Equipment as defined in the EN 50693 standard. C1 consider the de-installation, same as installation process; C2 consider the waste transport. Waste processing and disposal (C3-C4) has been modelled using a conservative and realistic scenario. The percentages for recycling, incineration (with or without energy recovery), and landfill disposal have been defined based on EN 50693.

Module D: Benefits and loads are calculated based on the substitution of primary materials and energy, crediting the system for the net amount of materials sent to recycling and energy recovery from Module C.

Characterisation Methods

The environmental impact indicators have been calculated using the characterisation methods and factors as specified in EN 15804:2012+A2:2019, based on the EF 3.1 reference package.

	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	GLO	IT	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO
Share of primary data		13%		100%	0%	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products		49.9%				-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites		0%				-	-	-	-	-	-	-	-	-	-	-	-

X=Declared module, GLO=Global, IT=Italy

Data Quality Assessment

The data quality assessment was conducted in accordance with the methodology outlined in the Commission Recommendation (EU) 2021/2279 (PEF method). The evaluation considered Technological (TeR), Geographical (GeR), and Time-related (TiR) Representativeness, as well as Precision (P). The overall data quality for the life cycle stages was assessed as "Good" for the Upstream and Downstream stages and "Very good" for the Core (manufacturing) stage .

Data Sources, Reference Years, and Share of Primary Data

Primary data, collected directly from the manufacturing site for the reference year 2024, were used for the core manufacturing processes (Module A3), including energy consumption and waste generation. Secondary data for upstream raw materials and transport (Modules A1-A2) and background processes were sourced from the Ecoinvent v3.10 database.

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Raw material , metals	Collected data and database	EPD owner Ecoinvent v3.10	2024	Primary / Secondary data	9.3%
Printed wiring board	Collected data and database	Ecoinvent v3.10	2024	Secondary data	0%
Electrical motors	Collected data and database	Ecoinvent v3.10	2024	Secondary data	0%
Generation of electricity used in manufacturing of product	Collected data and database	Ecoinvent v3.10	2024	Primary data	3.2%
Manufacturing of product	Collected data and database	EPD owner Ecoinvent v3.10	2024	Primary data	<2%
Transport of raw material to manufacturing site	Collected data and database	EPD owner Ecoinvent v3.10	2024	Primary data	<2%
		Total share of primary data, of GWP-GHG results for A1-A3			13%

Environmental performance

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

Mandatory impact category indicators according to EN 15804 (worst case)

		Results per 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.	8.47E+03	4.76E+01	6.76E+01	4.89E-03	2.79E+01	0.00E+00	0.00E+00	0.00E+00	2.86E+05	0.00E+00	5.59E+01	1.04E+01	4.87E+01	1.49E+02	-6.78E+03
GWP-fossil	kg CO_2 eq.	8.42E+03	4.76E+01	6.73E+01	4.89E-03	2.79E+01	0.00E+00	0.00E+00	0.00E+00	2.75E+05	0.00E+00	5.57E+01	1.04E+01	4.85E+01	1.49E+02	-6.79E+03
GWP-biogenic	kg CO_2 eq.	4.74E+01	1.16E-02	8.95E+01	0.00E+00	4.91E-02	0.00E+00	0.00E+00	0.00E+00	1.04E+04	0.00E+00	9.81E-02	2.54E-03	5.05E-02	1.88E-01	1.76E+01
GWP-luluc	kg CO_2 eq.	9.75E+00	1.44E-02	4.37E-02	0.00E+00	1.39E-02	0.00E+00	0.00E+00	0.00E+00	8.50E+02	0.00E+00	2.78E-02	3.13E-03	1.43E-01	1.08E-02	-8.41E+00
ODP	kg CFC 11 eq.	1.76E-04	7.00E-07	1.23E-06	0.00E+00	5.43E-07	0.00E+00	0.00E+00	0.00E+00	4.77E-03	0.00E+00	1.09E-06	1.53E-07	7.45E-07	6.24E-07	-5.65E-05
AP	mol H^+ eq.	1.07E+02	1.60E-01	3.06E-01	0.00E+00	1.27E-01	0.00E+00	0.00E+00	0.00E+00	1.40E+03	0.00E+00	2.54E-01	3.47E-02	3.28E-01	9.88E-02	-6.48E+01
EP-freshwater	kg P eq.	9.39E+00	3.16E-03	1.29E-02	0.00E+00	3.56E-03	0.00E+00	0.00E+00	0.00E+00	2.45E+02	0.00E+00	7.13E-03	6.90E-04	4.61E-03	1.74E-02	-4.28E+00
EP-marine	kg N eq.	1.14E+01	5.39E-02	9.55E-02	0.00E+00	4.21E-02	0.00E+00	0.00E+00	0.00E+00	2.43E+02	0.00E+00	8.42E-02	1.17E-02	1.16E-01	3.33E-02	-8.16E+00
EP-terrestrial	mol N eq.	1.28E+02	5.87E-01	1.04E+00	0.00E+00	4.62E-01	0.00E+00	0.00E+00	0.00E+00	2.11E+03	0.00E+00	9.25E-01	1.27E-01	1.25E+00	3.14E-01	-8.98E+01
POCP	kg NMVOC eq.	4.18E+01	2.41E-01	4.11E-01	7.26E-02	1.86E-01	0.00E+00	0.00E+00	0.00E+00	7.00E+02	0.00E+00	3.73E-01	2.34E-01	5.77E-01	2.94E-01	-2.71E+01
ADP-minerals&metals*	kg Sb eq.	1.60E+00	7.77E-05	5.16E-04	0.00E+00	2.27E-04	0.00E+00	0.00E+00	0.00E+00	6.01E-01	0.00E+00	4.55E-04	1.69E-05	1.38E-04	9.07E-05	-5.36E-01
ADP-fossil*	MJ	9.87E+04	6.88E+02	9.53E+02	0.00E+00	3.92E+02	0.00E+00	0.00E+00	0.00E+00	6.50E+06	0.00E+00	7.84E+02	1.50E+02	6.69E+02	3.33E+02	-6.52E+04
WDP*	m^3	2.88E+03	3.06E+00	9.64E+00	0.00E+00	2.02E+00	0.00E+00	0.00E+00	0.00E+00	7.34E+04	0.00E+00	4.05E+00	6.66E-01	3.52E+00	4.63E+00	-1.12E+03

* 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 experienced 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 (worst case)

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	kg CO_2 eq.	8.50E+03	4.76E+01	6.74E+01	4.89E-03	2.79E+01	0.00E+00	0.00E+00	0.00E+00	2.76E+05	0.00E+00	5.58E+01	1.04E+01	4.87E+01	1.49E+02	-6.80E+03

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 indicator (worst case)

		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	1.02E+04	7.66E+00	5.15E+01	0.00E+00	1.23E+01	0.00E+00	0.00E+00	0.00E+00	1.49E+06	0.00E+00	2.46E+01	1.67E+00	1.22E+01	1.61E+01	-4.92E+03
PERM	MJ	1.29E+03	0.00E+00	-1.29E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.14E+04	7.66E+00	-1.24E+03	0.00E+00	1.23E+01	0.00E+00	0.00E+00	0.00E+00	1.49E+06	0.00E+00	2.46E+01	1.67E+00	1.22E+01	1.61E+01	-4.92E+03
PENRE	MJ	9.73E+04	6.88E+02	9.53E+02	0.00E+00	3.92E+02	0.00E+00	0.00E+00	0.00E+00	6.50E+06	0.00E+00	7.84E+02	1.50E+02	6.69E+02	3.33E+02	-6.52E+04
PENRM	MJ	1.37E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.37E+03	0.00E+00
PENRT	MJ	9.87E+04	6.88E+02	9.53E+02	0.00E+00	3.92E+02	0.00E+00	0.00E+00	0.00E+00	6.50E+06	0.00E+00	7.84E+02	1.50E+02	6.69E+02	1.70E+03	-6.52E+04
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	8.35E+01	8.98E-02	3.37E-01	0.00E+00	7.34E-02	0.00E+00	0.00E+00	0.00E+00	5.40E+03	0.00E+00	1.47E-01	1.96E-02	1.10E-01	0.00E+00	0.00E+00

Waste indicators (worst case)

		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	2.37E+00	4.50E-03	1.82E-02	0.00E+00	8.86E-03	0.00E+00	0.00E+00	0.00E+00	9.62E+00	0.00E+00	1.77E-02	9.81E-04	4.40E-03	7.85E-03	-2.88E-01
Non-hazardous waste disposed	kg	8.94E+02	6.06E+01	2.52E+01	0.00E+00	1.15E+01	0.00E+00	0.00E+00	0.00E+00	1.33E+04	0.00E+00	2.30E+01	1.32E+01	3.52E+01	8.88E+00	-2.15E+02
Radioactive waste disposed	kg	1.30E-01	1.34E-04	1.31E-03	0.00E+00	2.74E-04	0.00E+00	0.00E+00	0.00E+00	4.67E+01	0.00E+00	5.47E-04	2.92E-05	1.79E-04	3.78E-04	-2.57E-02

Output flow indicators (worst case)

		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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	1.35E+02	0.00E+00	7.10E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.81E+02	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.30E+01	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Additional LCA results (other environmental performance results) of the product(s)

In the following table are represents the variation (A-C module) compare to the worst case:

LCA result of one declared unit product (A-C)	Unit	Min	Worst case	Delta [%]
GWP-total	kg CO_2 eq.	1.47E+05	2.95E+05	49.9%
GWP-fossil	kg CO_2 eq.	1.42E+05	2.84E+05	49.9%
GWP-biogenic	kg CO_2 eq.	5.23E+03	1.05E+04	49.7%
GWP-luluc	kg CO_2 eq.	4.26E+02	8.60E+02	49.6%
ODP	kg CFC 11 eq.	2.48E-03	4.95E-03	50.0%
AP	mol H+ eq.	7.66E+02	1.51E+03	50.7%
EP-freshwater	kg P eq.	1.27E+02	2.55E+02	50.1%
EP-marine	kg N eq.	1.28E+02	2.55E+02	50.2%
EP-terrestrial	mol N eq.	1.13E+03	2.24E+03	50.5%
POCP	kg NMVOC eq.	3.76E+02	7.44E+02	50.5%
ADP-minerals&metals	kg Sb eq.	1.40E+00	2.20E+00	63.5%
ADP-fossil	kg CO_2 eq.	3.28E+06	6.60E+06	49.6%
WDP	kg CO_2 eq.	3.82E+04	7.63E+04	50.1%
GWP-GHG	kg CO_2 eq.	1.42E+05	2.85E+05	49.9%
PERE	MJ	7.40E+05	1.50E+06	49.5%
PERM	MJ	8.90E+02	1.29E+03	68.8%
PERT	MJ	7.41E+05	1.50E+06	49.5%
PENRE	MJ	3.28E+06	6.60E+06	49.6%
PENRM	MJ	9.43E+02	1.37E+03	68.8%
PENRT	MJ	3.28E+06	6.60E+06	49.6%
SM	kg	0.00E+00	0.00E+00	-
RSF	MJ	0.00E+00	0.00E+00	-
NRSF	MJ	0.00E+00	0.00E+00	-
FW	m^3	2.72E+03	5.49E+03	49.6%
Hazardous waste disposed	kg	6.43E+00	1.21E+01	53.3%
Non-hazardous waste disposed	kg	7.31E+03	1.44E+04	50.8%
Radioactive waste disposed	kg	2.31E+01	4.68E+01	49.4%
Components for re-use	kg	0.00E+00	0.00E+00	-
Material for recycling	kg	3.46E+02	5.04E+02	68.6%
Materials for energy recovery	kg	2.10E+01	2.85E+01	73.5%
Exported energy, electricity	MJ	0.00E+00	0.00E+00	-
Exported energy, thermal	MJ	0.00E+00	0.00E+00	-

ADDITIONAL ENVIRONMENTAL INFORMATION

Extrapolation for to the other sizes in the range

This EPD performed on the worst case unit can be used as baseline for extrapolation for the other sizes. This is allowed because they belong to the same homogeneous environmental family as the reference product due to this characteristics:

- Same main functionality;
- Same product standards;
- Similar manufacturing technology: same type of materials and manufacturing processes.

NO.	Product Type	M	Mp	Ctot	P	Ct	Manufact. Distrib coeff.	Install. coeff.	Use stage coefficient			End of life coeff.
		[kg]	[kg]	[kWh]	[kW]	[kg]	A1…A4	A5	B1	B2	B6	C1…C4
1	WiSAN-P 14.1	633	56	419282	1.0	4.9	0.69	0.79	0.49	1.00	0.49	0.68
2	WiSAN-P 16.1	633	56	472513	1.0	4.9	0.69	0.79	0.49	1.00	0.56	0.68
4	WiSAN-P 18.1	682	56	600789	1.0	4.5	0.74	0.79	0.45	1.00	0.71	0.73
5	WiSAN-P 19.1	682	56	671545	1.0	4.5	0.74	0.79	0.45	1.00	0.79	0.73
6	WiSAN-P 20.1	682	56	744612	1.0	4.5	0.74	0.79	0.45	1.00	0.88	0.73
7	WiSAN-P 25.2	930	71	760778	1.0	10.0	1.00	1.00	1.00	1.00	0.90	1.00
8	WiSAN-P 30.2	930	71	849976	1.0	10.0	1.00	1.00	1.00	1.00	1.00	1.00
UNI EN 14825:2022, clima medio, SEER W12/7, SCOP W47/55												

Calculation example:

- The task is to extrapolate the Global Warming Potential for the unit WiSAN-P 20.1 of the Use stage.
- The extrapolation coefficient of the Use stage module B6 for WiSAN-P 20.1 is 0.88
- The Global Warming Potential of the functional unit for use stage is 2.86+E05 kg CO_2 eq/kWh
- GWPWiSAN-P 30.2 =2.86+E05 x 0.88 =2.52+E05 kg CO_2 eq/kWh

Compliance with the requirements of the EPBD (EU) 2024/1275 Directive

This Life Cycle Assessment (LCA) study and the related Environmental Product Declaration (EPD) have been developed in accordance with the EN 15804 standard.
The environmental impact data contained herein, particularly the Global Warming Potential (GWP) related to the life cycle modules (A-C-D), provide the necessary information for the calculation of the building's 'Life cycle Global Warming Potential' (Whole Life Carbon - WLC), as required by Article 7 of the (EU) 2024/1275 Directive (Energy Performance of Buildings Directive).
This EPD therefore allows designers and auditors to correctly include the environmental impact of the WiSAN-P heat pump in the overall assessment of the building's environmental performance.

The manufacturer however does not guarantee conformity of the building to the EPBD; conformity remains the responsibility of the building system integrator.

ABBREVIATIONS

All abbreviations used in the EPD must be added. Please add all the abbreviations used.

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
CLC	Co-location centre
CPC	Central product classification
GHS	Globally harmonized system of classification and labelling of chemicals
GRI	Global Reporting Initiative
SVHC	Substances of Very High Concern
ND	Not Declared
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
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

References

- PCR 2019:14, Construction products, Version 2.0.1. The governing Product Category Rules for this study.
- EN 15804:2012+A2:2019/AC:2021, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products. The core European standard on which the PCR is based.
- General Programme Instructions for the International EPD® System, Version 5.0.1. The general rules of the EPD programme operator.
- ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations Principles and procedures.
- UNI EN ISO 14040:2021 Environmental management. Life cycle assessment. Principles and frameworks.
- UNI EN ISO 14044:2021 Environmental management. Life cycle assessment. Requirements and guidelines.
- EN 50693:2019, Product category rules for life cycle assessments of electronic and electrical products and systems. (Referenced in your study for end-of-life scenarios).
- Central Product Classification (CPC) Series M No.77, v.2.1. United Nations, New York, 2015.
- Default list v. 3.0 of Environmental Impact Indicators: The International EPD System (www.environdec.com).
- AIB for residual mix
- LCA report “WiSAN-P_Report LCA_EPD”

VERSION HISTORY

Original Version of the EPD, 2025-11-17
Editorial correction of Table on page 14 (typographical error only), 2025-12-15

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