Product Environmental Profile

Air/Water Heater pump

Platinum BC V200 iR32
ALYA FS-A

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Independent verification of the declaration and data in compliance with ISO 14025: 2006 Internal: External: **X**	
The PCR review was conducted by a panel of experts chaired by Julie Orgelet (DDemain)	
PEPs are compliant with XP C08-100-1:2016 or EN 50693:2019 The components of the present PEP may not be compared with components from any other program	
Document complies with ISO 14025:2010 “Environmental labels and declarations. Type III environmental declarations”	

General information

Product category

Reversible split air-water heat pump with domestic hot water production.

Declared unit

To produce heating or cooling and domestic hot water thanks to an air-to-water heat pump of 6.82 kW* (heating capacity) according to the appropriate usage scenario and during the 17-year reference lifetime of the product.
*The capacity is to be adjusted according to the product considered in the range.

Functional unit

To produce 1 kW of heating or 1 kW of cooling and produce domestic hot water, according to the reference usage scenario and during the 17-year reference lifetime of the product.

Product information

Reference product: Platinum BC V200 iR32 6 MR – reference 7830819

Technical characteristics of the reference product

$P_{designh}$ *Design load for heating*	6.82 kW (1)	**$P_{designc}$** *Design load for cooling*	6.7 kW (2)
SCOP *Seasonal coefficient of performance*	4.95 (1)	**SEER** *Seasonal cooling efficiency*	8.44 (2)
AEC *Annual electricity consumption*	781 (3)	**Load profile**	L
Weight without packaging*	199.6 kg	**R32 coolant fluid weight**	1.5 kg

(*) *The indicated weight corresponds to the weight of the product within the framework of the PEP and may present slight variations with the indicated weight in the technical documentation.*

(1) According to EN 14825 - outside air temperature +7°C - water temperature 30/35°C

(2) According to EN 14825 - outside air temperature 35°C - average water temperature 18/23°C

(3) For Domestic hot water production

Constituent materials

Metals		Plastics		Others	
Steel	64.9%	Polyurethane	2.5%	Wood	7.1%
Copper	5.8%	Polystyrene	1.3%	Cardboard	3.4%
Aluminium	2.4%	ABS	1.0%	Enamel	1.6%
Brass	1.8%	Elastomer	1.0%	PCB	0.9%
Ferrite	0.6%	Polyamide	0.9%	Bitumen	0.8%
Other metals	0.6%	Other plastics	0.6%	Other materials	2.8%
Total	76.1%		7.3%		16.6%

Total weight of the modeled product: 228.3 kg (including 28.7 kg of primary packaging)

Products cover by this PEP declaration

This PEP declaration covers all the products in the same environmental homogeneous family below.

Baxi Spain

Commercial designation	Products references	
Platinum BC V200…	Indoor module	Outdoor module
…iR32 4 MR – 7830818	IMPI/E V200 4-6 M - 7804776	AWHP2R 4 MR - 7799987
…iR32 6 MR – 7830819	IMPI/E V200 4-6 M - 7804776	AWHP2R 6 MR - 7799991
…iR32 8 MR – 7830820	IMPI/E V200 8-10 M - 7804778	AWHP2R 8 MR – 7799992
…iR32 10 MR – 7830821	IMPI/E V200 8-10 M - 7804778	AWHP2R 10 MR – 7799993
…iR32 12 MR – 7830822	IMPI/E V200 12-16M - 7804779	AWHP2R 12 MR – 7799995
…iR32 12 TR – 7830824	IMPI/E V200 12-16M - 7804779	AWHP2R 12 TR – 7799997
…iR32 16 MR – 7830823	IMPI/E V200 12-16M - 7804779	AWHP2R 16 MR – 7799996
…iR32 16 TR - 7830825	IMPI/E V200 12-16M - 7804779	AWHP2R 16 TR - 7799998

Baxi Italy

Commercial reference	Products references	
	Indoor unit	Outdoor unit
ALYA 4M E FS-A	SYSMGR ALYA 4-6M E FS-A - 7804748	AWHP2R 4 MR - 7799987
ALYA 6M E FS-A	SYSMGR ALYA 4-6M E FS -A - 7804748	AWHP2R 6 MR - 7799991
ALYA 8M E FS-A	SYSMGR ALYA 8-10M E FS -A - 7804762	AWHP2R 8 MR - 7799992
ALYA 10M E FS-A	SYSMGR ALYA 8-10M E FS -A - 7804762	AWHP2R 10 MR - 7799993
ALYA 12M E FS-A	SYSMGR ALYA 12-16M E FS -A - 7804765	AWHP2R 12 MR - 7799995
ALYA 12T E FS-A	SYSMGR ALYA 12-16M E FS -A - 7804765	AWHP2R 12 TR - 7799997
ALYA 16M E FS-A	SYSMGR ALYA 12-16M E FS -A - 7804765	AWHP2R 16 MR - 7799996
ALYA 16T E FS-A	SYSMGR ALYA 12-16M E FS -A - 7804765	AWHP2R 16 TR - 7799998
ALYA 4M H FS-A	SYSMGR ALYA 4-6M H FS-A – 7804766	AWHP2R 4 MR - 7799987
ALYA 6M H FS-A	SYSMGR ALYA 4-6M H FS -A – 7804766	AWHP2R 6 MR - 7799991
ALYA 8M H FS-A	SYSMGR ALYA 8-10M H FS -A - 7804767	AWHP2R 8 MR - 7799992
ALYA 10M H FS-A	SYSMGR ALYA 8-10M H FS -A - 7804768	AWHP2R 10 MR - 7799993
ALYA 12M H FS-A	SYSMGR ALYA 12-16M H FS -A - 7804768	AWHP2R 12 MR - 7799995
ALYA 12T H FS-A	SYSMGR ALYA 12-16M H FS -A – 7804768	AWHP2R 12 TR - 7799997
ALYA 16M H FS-A	SYSMGR ALYA 12-16M H FS -A – 7804768	AWHP2R 16 MR - 7799996
ALYA 16T H FS-A	SYSMGR ALYA 12-16M H FS -A - 7804768	AWHP2R 16 TR - 7799998

Life Cycle Assessment methodology

Methodology

The Product Environmental Profile (PEP) is based on Life Cycle Assessment in accordance with the rules published by PEP Ecopassport program (for more information on the program, consult the website www.pep-ecopassport.org).
All system boundaries are considered (manufacturing, distribution, installation, use, end of life) as well as benefits and costs beyond the life cycle.
The results were obtained using EIME V5.9.4 software with its "January 2022" database.

Manufacturing stage

Raw materials and components	The production of 99.9 % of the reference product weight (materials, components and packaging), as well as the shaping and assembly processes of the components were taken into account.
Raw materials and components packaging	The production and end of life of the packaging used for the transport of materials and components from the suppliers to the production site have been recorded.
Manufacturing waste	We have identified the scrap rates and associated end of life of certain parts. For the other parts, we considered a amount of waste compliant to the PSR, i.e.: • 005 times for the amount of material for plastic injection processes and elastomer; • 0.3 times for the amount of material for all other materials and other shaping processes. The default end of life scenario for waste id modelling as follows: 100% of incinerated waste without energy recovery. A transport distance of 100 km is applied for the collection of waste to the treatment centre.
Product manufacturing	The modelling integrates the flows of manufacturing sites (energy, water, consumables of the industrial processes of the production site and the emissions of refrigerant). • Internal module is manufactured in MERTZWILLER in France • External module is manufactured in south Asia.
Transport	The upstream transport of materials and components (with their packaging) is taken into account according to 3 models: local, intra-continental and inter-continental transport.

Distribution stage

Transport	The distribution stage includes the transport by truck of the packaged product over a distance of 3500 km from our last logistics platforms to the distributor, then to the place of implementation in Europe. No reconditioning packaging was considered.

Installation stage

Accessory	The installation phase includes a floor installation support and a refrigeration connection. For each of these accessories, we modeled material and production scrap, shaping process, packaging, end of life of scrap and transport to the place of implementation. 2 concrete sleepers are also modeled. No additional refrigerant charge was considered during the installation stage.
Packaging waste	The disposal (evacuation and treatment) of the packaging of the reference product and the safety group is modelled according to the **European** scenario below.

	Cardboard & Papers	Wood	Plastics
Recycling	82%	31%	41%
Energy recovery	9%	31%	37%
Not recovered (100% buried)	9%	38%	22%

Use stage

Electricity consumption

Electricity consumption is calculated as below:

$$C_{tot} = \frac{Ph}{SCOP * \left(1 + \frac{Fregul}{100}\right)} * tcalorific + \frac{Pc}{SEER} * tcooling \quad * \mathrm{RLT} + \mathrm{AEC} * \mathrm{RLT}$$

With:

- Ctot expressed in kWh
- SCOP, seasonal coefficient of performance defined according to EN 14825 (1)
- SEER, seasonal cooling efficiency defined according to EN 14825 (2)
- Fregul= 4, default setting for the water heating application
- Tcalorific, equivalent annual operating hours of the unit in active heating mode.
- Tcooling, equivalent annual operating hours of the unit in active cooling mode.
- Ph = Pdesignh, heat load according to regulation n°813/2013 (1)
- Pc = Pdesignc, cooling load, according to regulation n°813/2013 (2)
- AEC, annual electricity consumption for hot water for the declared load profile according to the regulation 811/2013
- RLT, reference lifetime of the device

(1) According to EN 14825 - outside air temperature +7°C - water temperature 30/35°C
(2) According to EN 14825 - outside air temperature 35°C - average water temperature 18/23°C

The electrical energy model considered for European use is:
Electricity Mix; Production mix; Low voltage; UE-27, (reference year: 2018)

Maintenance	A biennial inspection, considering the travel of a technician over 100km, is modelled for the entire life of the product, which means 8 control visits. The modeling of the replacement of the magnesium anode (once during the reference lifetime) includes its manufacture (with its waste), its transport and the end of life of the replaced part.
Refrigerant leaks	The leak of R32 refrigerant into the air, and its refill (including production of new refrigerant and transport) are considered.

End of life stage

Product end of life	The Heat pump falls within the scope of the WEEE directive (2012/19/EU). The end of life must therefore be managed by a local EEE waste treatment sector. We used The Life Cycle Inventories (LCI) developed by ECOSYSTEM*. **ECOSYSTEM is the Eco-organisation in charge of ensuring the extended producer responsibility for WEEE in France.*
Refrigerant end of life	The refrigerant end of life follows the following scenario: 10% of fluid not collected, 90% of the fluid collected recovered for energy and 10% of the fluid collected incinerated without recovery.
Transport	The considered transport to the treatment center is 1000 km for the refrigerant and 100 km for the product.

Benefits and loads

Loads	Loads related to the use of recycled materials are considered.
Benefits	The benefits related to the recycling of the packaging (at installation stage) and the product (at end-of-life stage) are considered. The Life Cycle Inventories (LCI) developed by ECOSYSTEM were used to model product recycling.

The method EF3.0 is applied for this declaration.

Environmental impacts

Environmental impacts at the declared unit per device, corresponding to the reference product

Impact indicators	Unit	Total	Manufacturing	Distribution	Installation	Use					End of life	Benefits and loads
		A-C	A1-A3	A4	A5	B1-B7	B1	B2	B6	B3-B5,B7	C1-C4	D
Mandatory indicators												
Climate change - total (IPCC 2013)	kg CO_2 eq.	3.09E+04	1.44E+03	7.85E+01	9.46E+01	2.89E+04	2.22E+02	2.36E+02	2.84E+04	0.00E+00	3.54E+02	-5.09E+02
Climate change - fossil fuels	kg CO_2 eq.	3.08E+04	1.41E+03	7.85E+01	9.03E+01	2.89E+04	2.22E+02	2.34E+02	2.84E+04	0.00E+00	3.41E+02	-4.97E+02
Climate change - biogenics	kg CO_2 eq.	9.01E+01	3.34E+01	0.00E+00	4.30E+00	3.91E+01	0.00E+00	1.21E+00	3.79E+01	0.00E+00	1.33E+01	-1.18E+01
Climate change - land use and land use transformation	kg CO_2 eq.	2.50E-06	2.50E-06	0.00E+00	3.19E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ozone depletion (WMO 2014)	kg CFC-11 eq.	1.14E-03	7.83E-04	6.95E-05	6.96E-06	2.56E-04	0.00E+00	1.34E-04	1.22E-04	0.00E+00	2.63E-05	4.83E-05
Acidification (AP)	kg H+ eq.	1.75E+02	9.45E+00	3.54E-01	7.10E-01	1.63E+02	0.00E+00	7.57E-01	1.62E+02	0.00E+00	1.87E+00	-2.32E+01
Freshwater eutrophication	kg P eq.	9.13E-02	6.55E-03	9.23E-06	5.06E-04	7.79E-02	0.00E+00	3.44E-05	7.79E-02	0.00E+00	6.39E-03	-1.14E+00
Marine aquatic eutrophication	kg N eq.	2.07E+01	1.04E+00	1.64E-01	5.06E-04	1.86E+01	0.00E+00	1.99E-01	1.84E+01	0.00E+00	8.18E-01	-9.76E-01
Terrestrial eutrophication	mol N eq.	2.96E+02	1.12E+01	1.77E+00	7.68E-01	2.79E+02	0.00E+00	2.45E+00	2.77E+02	0.00E+00	2.34E+00	-1.02E+01
Photochemical ozone formation	kg NMVOC eq.	6.55E+01	3.85E+00	5.75E-01	2.49E-01	6.02E+01	0.00E+00	9.91E-01	5.92E+01	0.00E+00	6.90E-01	-4.02E+00
Abiotic resource depletion - metals and minerals	kg SB eq.	7.59E-02	7.05E-02	6.77E-09	2.77E-03	2.08E-03	0.00E+00	1.58E-05	2.06E-03	0.00E+00	5.85E-04	-4.90E-02
Abiotic resource depletion - fossils	MJ	7.83E+05	5.08E+04	9.57E+02	9.21E+02	7.26E+05	0.00E+00	1.81E+03	7.24E+05	0.00E+00	3.69E+03	8.57E+02
Water requirement	m^3	6.61E+04	5.18E+02	4.00E+00	3.74E+01	9.66E+02	0.00E+00	1.99E+01	9.46E+02	0.00E+00	6.46E+04	-2.26E+05
Optional indicators												
Emission of fine particles	Disease occurrence	1.34E-03	6.04E-05	9.53E-07	4.77E-06	1.26E-03	0.00E+00	3.30E-06	1.26E-03	0.00E+00	1.16E-05	-5.75E-05
Ionizing radiation, human health	kg U235 eq.	5.62E+04	1.24E+04	1.75E-01	1.53E+03	4.23E+04	0.00E+00	5.92E+00	4.23E+04	0.00E+00	2.24E+01	-2.11E+01
Ecotoxicity (freshwater)	CTUe	4.03E+05	6.44E+04	3.22E+02	3.07E+03	3.07E+05	9.70E-03	7.97E+02	3.06E+05	0.00E+00	2.79E+04	-9.81E+04
Human toxicity, carcinogenic effects	CTUh	4.73E-04	4.21E-04	8.97E-10	4.82E-05	3.76E-06	0.00E+00	4.49E-07	3.32E-06	0.00E+00	2.05E-07	1.78E-05
Human toxicity, non-carcinogenic effects	CTUh	2.28E-04	7.38E-05	1.99E-07	5.15E-06	1.37E-04	2.29E-10	5.04E-06	1.32E-04	0.00E+00	1.19E-05	-1.24E-04
Impacts related to land use/soil quality	-	1.07E+03	1.33E+01	0.00E+00	6.30E+00	5.66E+02	0.00E+00	1.18E-07	5.66E+02	0.00E+00	4.81E+02	-2.34E+03

B1: Use; B2: Maintenance; B3: Repair; B4: Replacement; B5: Restoration; B6: Energy requirements; B7: Water requirements

Environmental impacts to the declared unit per device, corresponding to the reference product

Impact indicators	Unit	Total	Manufacturing	Distribution	Installation	Use					End of life	Benefits and loads
		A-C	A1-A3	A4	A5	B1-B7	B1	B2	B6	B3-B5,B7	C1-C4	D
Resource use indicators												
Total use of primary energy during the life cycle	MJ	9.23E+05	5.16E+04	9.57E+02	1.02E+03	8.65E+05	0.00E+00	1.81E+03	8.64E+05	0.00E+00	4.00E+03	-3.70E+02
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	1.40E+05	3.29E+02	6.41E-03	6.59E+01	1.39E+05	0.00E+00	1.37E+00	1.39E+05	0.00E+00	3.11E+02	-1.23E+03
Use of renewable primary energy resources used as raw materials	MJ	5.61E+02	5.23E+02	0.00E+00	3.17E+01	7.02E+00	0.00E+00	7.02E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources	MJ	1.40E+05	8.52E+02	6.41E-03	9.76E+01	1.39E+05	0.00E+00	8.39E+00	1.39E+05	0.00E+00	3.11E+02	-1.23E+03
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	7.82E+05	5.00E+04	9.57E+02	9.15E+02	7.26E+05	0.00E+00	1.79E+03	7.24E+05	0.00E+00	3.69E+03	4.25E+02
Use of non-renewable primary energy resources used as raw materials	MJ	7.73E+02	7.53E+02	0.00E+00	6.43E+00	1.33E+01	0.00E+00	1.33E+01	0.00E+00	0.00E+00	0.00E+00	4.32E+02
Total use of non-renewable primary energy resources	MJ	7.83E+05	5.08E+04	9.57E+02	9.21E+02	7.26E+05	0.00E+00	1.81E+03	7.24E+05	0.00E+00	3.69E+03	8.57E+02
Use of secondary materials, water and energy resources												
Use of secondary materials	kg	3.25E+01	3.25E+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
Use of renewable secondary fuels	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
Use of non-renewable secondary fuels	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
Net use of freshwater	m^3	2.26E+02	1.08E+01	9.31E-02	6.37E-01	2.37E+01	0.00E+00	4.37E-01	2.33E+01	0.00E+00	1.91E+02	-1.76E+03
Waste category indicators												
Hazardous waste disposed	kg	3.62E+03	2.83E+03	6.53E-02	2.56E+02	5.33E+02	0.00E+00	1.51E+00	5.31E+02	0.00E+00	2.08E-04	2.68E+02
Non hazardous waste disposed	kg	4.89E+03	5.74E+02	8.02E-02	2.05E+02	4.11E+03	0.00E+00	2.00E+01	4.09E+03	0.00E+00	1.45E+00	-1.14E+02
Radioactive waste disposed	kg	1.23E+00	2.66E-01	1.57E-02	6.09E-02	8.83E-01	0.00E+00	2.65E-02	8.56E-01	0.00E+00	7.21E-05	-8.08E-03
Output flow indicators												
Components for reuse	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
Materials for recycling	kg	2.09E+02	2.29E+01	0.00E+00	1.46E+01	3.51E-01	0.00E+00	3.51E-01	0.00E+00	0.00E+00	1.71E+02	0.00E+00
Materials for energy recovery	kg	3.13E+01	1.12E+00	0.00E+00	7.17E+00	2.70E-02	0.00E+00	2.70E-02	0.00E+00	0.00E+00	2.30E+01	0.00E+00
Exported Energy	MJ	7.23E+00	1.41E+00	0.00E+00	5.81E+00	1.30E-02	0.00E+00	1.30E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00

B1: Use; B2: Maintenance; B3: Repair; B4: Replacement; B5: Restoration; B6: Energy requirements; B7: Water requirements

Biogenic carbon content

- Biogenic carbon content of the product: 0 kg C
- Biogenic carbon content of the associated packaging: 8.58 kg C

Environmental impacts per kW, corresponding to the functional unit

The PEP was drawn up under the assumption 1 kW of heating or cooling and domestic hot water power being supplied. The real impact of the stages of the life cycle of a product installed in an actual situation is calculated by the user of the PEP by multiplying the impact concerned by the total heating and cooling capacity of 6.79 kW.

Impact indicators	Unit	Total	Manufacturing	Distribution	Installation	Use					End of life	Benefits and loads
		A-C	A1-A3	A4	A5	B1-B7	B1	B2	B6	B3-B5,B7	C1-C4	D
Mandatory indicators												
Climate change - total (IPCC 2013)	kg CO_2 eq.	4.55E+03	2.13E+02	1.16E+01	1.39E+01	4.26E+03	3.27E+01	3.47E+01	4.19E+03	0.00E+00	5.22E+01	-7.50E+01
Climate change - fossil fuels	kg CO_2 eq.	4.53E+03	2.08E+02	1.16E+01	1.33E+01	4.25E+03	3.27E+01	3.45E+01	4.18E+03	0.00E+00	5.02E+01	-7.33E+01
Climate change - biogenics	kg CO_2 eq.	1.33E+01	4.91E+00	0.00E+00	6.33E-01	5.77E+00	0.00E+00	1.79E-01	5.59E+00	0.00E+00	1.96E+00	-1.74E+00
Climate change - land use and land use transformation	kg CO_2 eq.	3.68E-07	3.68E-07	0.00E+00	4.69E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ozone depletion (WMO 2014)	kg CFC-11 eq.	1.68E-04	1.15E-04	1.02E-05	1.02E-06	3.77E-05	0.00E+00	1.98E-05	1.79E-05	0.00E+00	3.87E-06	7.12E-06
Acidification (AP)	kg H+ eq.	2.58E+01	1.39E+00	5.21E-02	1.05E-01	2.40E+01	0.00E+00	1.12E-01	2.39E+01	0.00E+00	2.75E-01	-3.42E+00
Freshwater eutrophication	kg P eq.	1.35E-02	9.65E-04	1.36E-06	7.46E-05	1.15E-02	0.00E+00	5.06E-06	1.15E-02	0.00E+00	9.41E-04	-1.68E-01
Marine aquatic eutrophication	kg N eq.	3.04E+00	1.53E-01	2.41E-02	7.46E-05	2.74E+00	0.00E+00	2.94E-02	2.71E+00	0.00E+00	1.20E-01	-1.44E-01
Terrestrial eutrophication	mol N eq.	4.35E+01	1.65E+00	2.61E-01	1.13E-01	4.12E+01	0.00E+00	3.61E-01	4.08E+01	0.00E+00	3.45E-01	-1.50E+00
Photochemical ozone formation	kg NMVOC eq.	9.65E+00	5.67E-01	8.47E-02	3.67E-02	8.86E+00	0.00E+00	1.46E-01	8.72E+00	0.00E+00	1.02E-01	-5.92E-01
Abiotic resource depletion - metals and minerals	kg SB eq.	1.12E-02	1.04E-02	9.97E-10	4.08E-04	3.06E-04	0.00E+00	2.33E-06	3.03E-04	0.00E+00	8.61E-05	-7.21E-03
Abiotic resource depletion - fossils	MJ	1.15E+05	7.48E+03	1.41E+02	1.36E+02	1.07E+05	0.00E+00	2.66E+02	1.07E+05	0.00E+00	5.43E+02	1.26E+02
Water requirement	m^3	9.74E+03	7.62E+01	5.89E-01	5.51E+00	1.42E+02	0.00E+00	2.93E+00	1.39E+02	0.00E+00	9.52E+03	-3.33E+04
Optional indicators												
Emission of fine particles	Disease occurrence	1.97E-04	8.90E-06	1.40E-07	7.02E-07	1.86E-04	0.00E+00	4.85E-07	1.85E-04	0.00E+00	1.71E-06	-8.47E-06
Ionizing radiation, human health	kg U235 eq.	8.28E+03	1.83E+03	2.57E-02	2.26E+02	6.23E+03	0.00E+00	8.72E-01	6.23E+03	0.00E+00	3.30E+00	-3.10E+00
Ecotoxicity (freshwater)	CTUe	5.93E+04	9.48E+03	4.75E+01	4.52E+02	4.52E+04	1.43E-03	1.17E+02	4.51E+04	0.00E+00	4.10E+03	-1.44E+04
Human toxicity, carcinogenic effects	CTUh	6.97E-05	6.20E-05	1.32E-10	7.10E-06	5.54E-07	0.00E+00	6.61E-08	4.88E-07	0.00E+00	3.02E-08	2.63E-06
Human toxicity, non-carcinogenic effects	CTUh	3.35E-05	1.09E-05	2.94E-08	7.58E-07	2.01E-05	3.37E-11	7.42E-07	1.94E-05	0.00E+00	1.75E-06	-1.83E-05
Impacts related to land use/soil quality	-	1.57E+02	1.95E+00	0.00E+00	9.28E-01	8.33E+01	0.00E+00	1.74E-08	8.33E+01	0.00E+00	7.08E+01	-3.44E+02

B1: Use; B2: Maintenance; B3: Repair; B4: Replacement; B5: Restoration; B6: Energy requirements; B7: Water requirements

Environmental impacts per kW, corresponding to the functional unit

The PEP was drawn up under the assumption 1 kW of heating or cooling and domestic hot water power being supplied. The real impact of the stages of the life cycle of a product installed in an actual situation is calculated by the user of the PEP by multiplying the impact concerned by the total heating and cooling capacity of 6.79 kW.

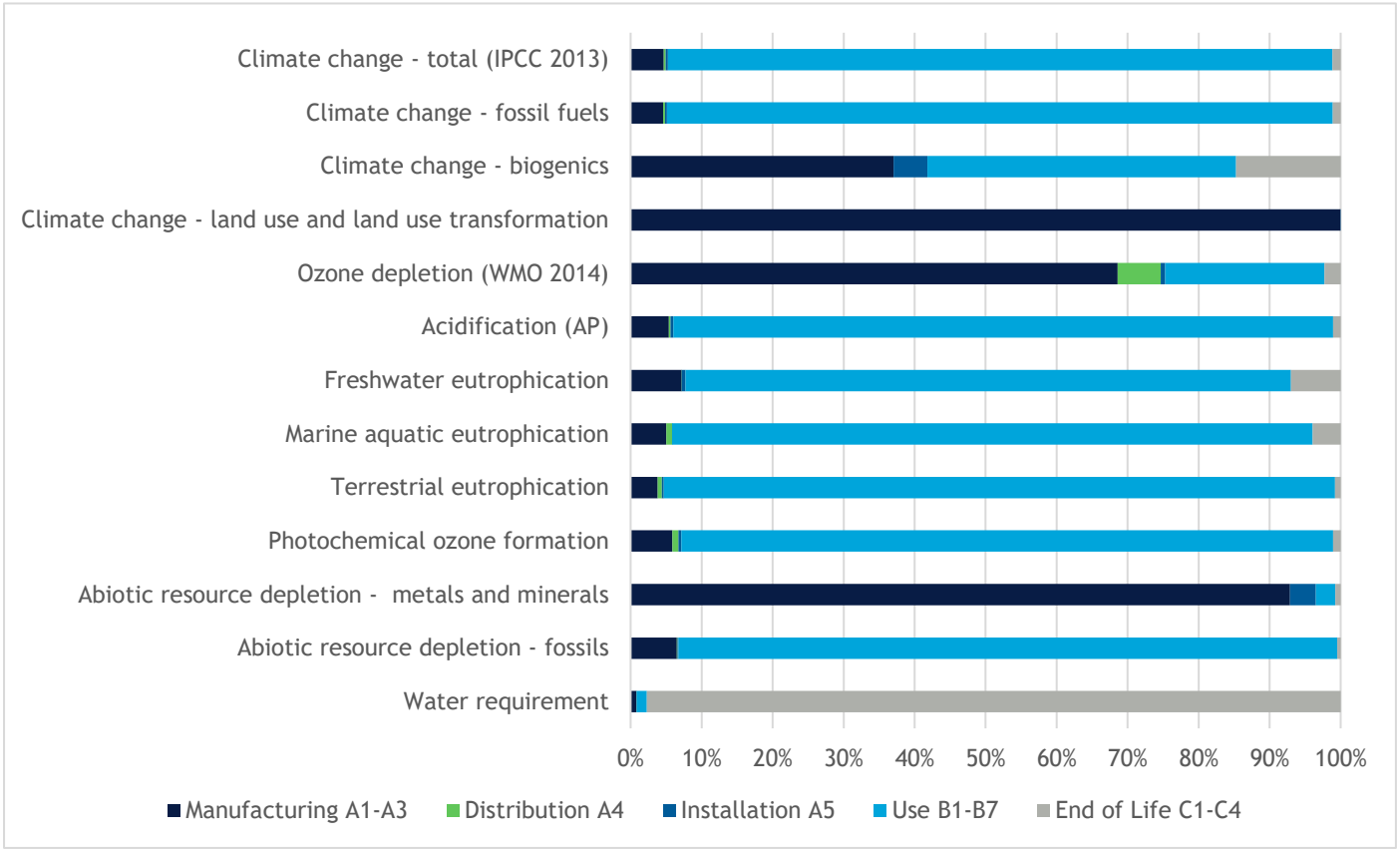
Impact indicators	Unit	Total	Manufacturing	Distribution	Installation	Use					End of life	Benefits and loads
		A-C	A1-A3	A4	A5	B1-B7	B1	B2	B6	B3-B5,B7	C1-C4	D
Resource use indicators												
Total use of primary energy during the life cycle	MJ	1.36E+05	7.61E+03	1.41E+02	1.50E+02	1.27E+05	0.00E+00	2.67E+02	1.27E+05	0.00E+00	5.89E+02	-5.45E+01
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	2.06E+04	4.85E+01	9.44E-04	9.71E+00	2.05E+04	0.00E+00	2.02E-01	2.05E+04	0.00E+00	4.58E+01	-1.81E+02
Use of renewable primary energy resources used as raw materials	MJ	8.27E+01	7.70E+01	0.00E+00	4.67E+00	1.03E+00	0.00E+00	1.03E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources	MJ	2.07E+04	1.25E+02	9.44E-04	1.44E+01	2.05E+04	0.00E+00	1.24E+00	2.05E+04	0.00E+00	4.58E+01	-1.81E+02
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	1.15E+05	7.37E+03	1.41E+02	1.35E+02	1.07E+05	0.00E+00	2.64E+02	1.07E+05	0.00E+00	5.43E+02	6.25E+01
Use of non-renewable primary energy resources used as raw materials	MJ	1.14E+02	1.11E+02	0.00E+00	9.48E-01	1.96E+00	0.00E+00	1.96E+00	0.00E+00	0.00E+00	0.00E+00	6.36E+01
Total use of non-renewable primary energy resources	MJ	1.15E+05	7.48E+03	1.41E+02	1.36E+02	1.07E+05	0.00E+00	2.66E+02	1.07E+05	0.00E+00	5.43E+02	1.26E+02
Use of secondary materials, water and energy resources												
Use of secondary materials	kg	4.79E+00	4.79E+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
Use of renewable secondary fuels	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
Use of non-renewable secondary fuels	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
Net use of freshwater	m^3	3.33E+01	1.59E+00	1.37E-02	9.38E-02	3.49E+00	0.00E+00	6.44E-02	3.43E+00	0.00E+00	2.81E+01	-2.59E+02
Waste category indicators												
Hazardous waste disposed	kg	5.32E+02	4.16E+02	9.61E-03	3.77E+01	7.85E+01	0.00E+00	2.23E-01	7.82E+01	0.00E+00	3.07E-05	3.94E+01
Non hazardous waste disposed	kg	7.20E+02	8.45E+01	1.18E-02	3.01E+01	6.05E+02	0.00E+00	2.94E+00	6.03E+02	0.00E+00	2.14E-01	-1.68E+01
Radioactive waste disposed	kg	1.81E-01	3.92E-02	2.31E-03	8.97E-03	1.30E-01	0.00E+00	3.91E-03	1.26E-01	0.00E+00	1.06E-05	-1.19E-03
Output flow indicators												
Components for reuse	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
Materials for recycling	kg	3.08E+01	3.37E+00	0.00E+00	2.15E+00	5.17E-02	0.00E+00	5.17E-02	0.00E+00	0.00E+00	2.52E+01	0.00E+00
Materials for energy recovery	kg	4.61E+00	1.65E-01	0.00E+00	1.06E+00	3.98E-03	0.00E+00	3.98E-03	0.00E+00	0.00E+00	3.39E+00	0.00E+00
Exported Energy	MJ	1.07E+00	2.08E-01	0.00E+00	8.56E-01	1.91E-03	0.00E+00	1.91E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00

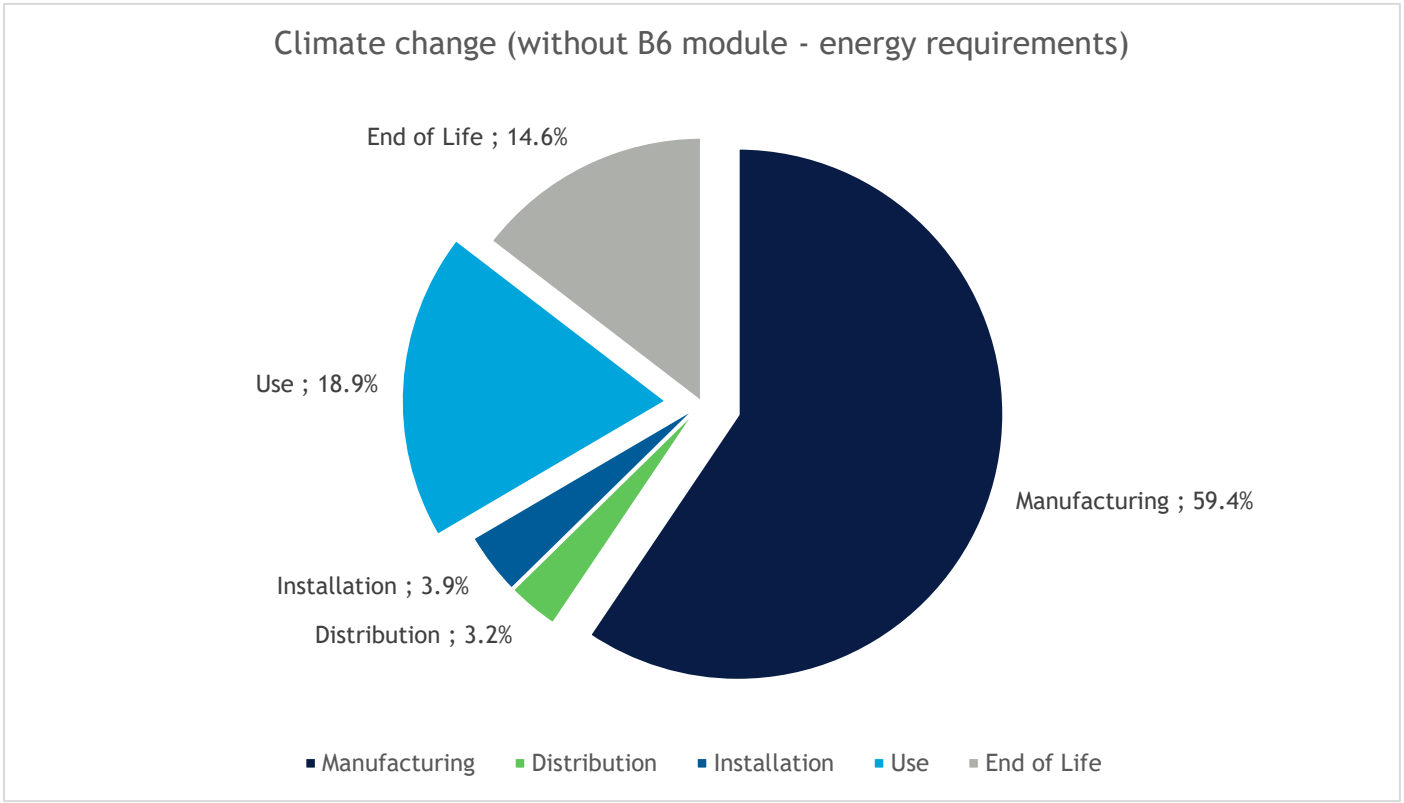
B1: Use; B2: Maintenance; B3: Repair; B4: Replacement; B5: Restoration; B6: Energy requirements; B7: Water requirements

Biogenic carbon content

- Biogenic carbon content of the product: 0 kg C
- Biogenic carbon content of the associated packaging: 1.26 kg C

Distribution of environmental impacts





Extrapolation rules

Calculation formula

At the declared unit, the environmental impacts for other covered references can be determined based on the formulas below and the data for each reference.

Phase	Extrapolation rules applied for the declared unit
Manufacturing	$\frac{Mass\ of\ product\ considered + Mass\ of\ packaging\ of\ the\ product\ considered\ (kg)}{Mass\ of\ the\ reference\ product + Mass\ of\ packaging\ of\ the\ reference\ product\ (kg)}$
Distribution	$\frac{Mass\ of\ product\ considered + Mass\ of\ packaging\ of\ the\ product\ considered\ (kg)}{Mass\ of\ the\ reference\ product + Mass\ of\ packaging\ of\ the\ reference\ product\ (kg)}$
Installation	$\frac{Mass\ of\ packaging\ of\ the\ product\ considered\ (kg)}{Mass\ of\ packaging\ of\ the\ reference\ product\ (kg)}$
Use - Emissions	1
Use - Maintenance	1
Use - Energy consumption	$\frac{Total\ energy\ consumption\ of\ the\ product\ considered\ (kWh)}{Total\ energy\ consumption\ of the\ reference\ product\ (kWh)}$
End of life	$\frac{Mass\ of\ the\ product\ considered\ (kg)}{Mass\ of\ the\ reference\ product\ (kg)}$
Benefits and loads	$\frac{Mass\ of\ product\ considered + Mass\ of\ packaging\ of\ the\ product\ considered\ (kg)}{Mass\ of\ the\ reference\ product + Mass\ of\ packaging\ of\ the\ reference\ product\ (kg)}$
Biogenic carbon content of the associated packaging	$\frac{Mass\ of\ packaging\ of\ the\ product\ considered\ (kg)}{Mass\ of\ packaging\ of\ the\ reference\ product\ (kg)}$

To determine the coefficients at the functional unit level, the coefficients at the declared unit level must be multiplied by the ratio between the rated power of the reference product and the rated power of the product considered.

$$Extrapolation\ coefficient\ at\ the\ declared\ unit \times \left(\frac{Capacity\ of\ the\ reference\ product}{Capacity\ of\ the\ product\ considered}\right)$$

The capacity of the product corresponding here at the rated load of the device in cold and hot modes, with respect to the operating time in each of the modes expressed in kW and defined by the following formula:

$$P_{rev} = \frac{t_{calorific} \times P_h + t_{cooling} \times P_c}{t_{calorific} + t_{cooling}}$$

With:

- Tcalorific, equivalent annual operating hours of the unit in active heating mode (2066 h)
- Tcooling, equivalent annual operating hours of the unit in active cooling mode (600 h)
- Ph = Pdesignh, heat load
- Pc = Pdesignc, cooling load

Input data to calculate the environmental impacts of other products in the range

Heat pump designation	Weight[1] (kg)		Capacity[2] (kW)	Total eletricity consumption (kWh)
	Product	Packaging		
Platinum BC V200 iR32 4 MR ALYA 4M E FS A	199.6	28.7	5.32	58276
Platinum BC V200 iR32 6 MR ALYA 6M E FS A	199.6	28.7	6.79	69377
Platinum BC V200 iR32 8 MR ALYA 8M E FS A	218.6	29.9	8.20	78679
Platinum BC V200 iR32 10 MR ALYA 10M E FS A	218.6	29.9	9.41	88523
Platinum BC V200 iR32 12 MR ALYA 12M E FS A	243.1	29.9	11.72	125241
Platinum BC V200 iR32 12 TR ALYA 12T E FS A	258.1	29.9	11.72	125241
Platinum BC V200 iR32 16 MR ALYA 16M E FS A	243.1	29.9	14.40	152811
Platinum BC V200 iR32 16 TR ALYA 16T E FS A	258.1	29.9	14.40	152811
ALYA 4M H FS -A	196.1	28.7	5.32	58276
ALYA 6M H FS -A	196.1	28.7	6.79	69377
ALYA 8M H FS -A	215.1	29.9	8.20	78679
ALYA 10M H FS -A	215.1	29.9	9.41	88523
ALYA 12M H FS -A	239.6	29.9	11.72	125241
ALYA 12T H FS -A	254.6	29.9	11.72	125241
ALYA 16M H FS -A	239.6	29.9	14.40	152811
ALYA 16T H FS -A	254.6	29.9	14.40	152811

(1) The indicated weight corresponds to the weight of the product within the framework of the PEP and may present slight variations with the indicated weight in the technical documentation.
(2) Capacity: Prev - rated load of the device in cold and hot modes, with respect to the operating time in each of the modes

Extrapolation coefficient for declared unit

For each stage of the life cycle, the environmental impacts of the product concerned are calculated by multiplying the impacts of the declaration corresponding to the reference product by the extrapolation coefficient. The "Total" column should be calculated by adding the environmental impacts of each stage of the life cycle.

Electric backup

Platinum BC V200 iR32…	**…4 MR**	**…6 MR**	**…8 MR**	**…10 MR**	**…12 MR**	**…12 TR**	**…16 MR**	**…16 TR**
ALYA… …FS A	**…4M E…**	**…6M E**	**…8M E**	**…10M E**	**…12M E**	**…12T E**	**…16M E**	**…16T E**
Manufacturing	1.000	1.000	1.089	1.089	1.196	1.262	1.196	1.262
Distribution	1.000	1.000	1.089	1.089	1.196	1.262	1.196	1.262
Installation	1.000	1.000	1.042	1.042	1.042	1.042	1.042	1.042
Use - Emissions	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Use - Maintenance	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Use – Energy consumption	0.840	1.000	1.134	1.276	1.805	1.805	2.203	2.203
End of life	1.000	1.000	1.095	1.095	1.218	1.293	1.218	1.293
Benefits and loads	1.000	1.000	1.089	1.089	1.196	1.262	1.196	1.262

Hydraulic backup

ALYA… …FS A	**…4M H…**	**…6M H**	**…8M H**	**…10M H**	**…12M H**	**…12T H**	**…16M H**	**…16T H**
Manufacturing	0.985	0.985	1.073	1.073	1.181	1.246	1.181	1.246
Distribution	0.985	0.985	1.073	1.073	1.181	1.246	1.181	1.246
Installation	1.000	1.000	1.042	1.042	1.042	1.042	1.042	1.042
Use - Emissions	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Use - Maintenance	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Use – Energy consumption	0.840	1.000	1.134	1.276	1.805	1.805	2.203	2.203
End of life	0.982	0.982	1.078	1.078	1.201	1.276	1.201	1.276
Benefits and loads	0.985	0.985	1.073	1.073	1.181	1.246	1.181	1.246

Further information

For any other additional information on the PEP, please contact us at **PEP-HP@BDRThermea.com**