


## Product Environmental Profile

Air/Water Heater pump

Platinum BC Mural iR32  
ALYA WH



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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 for heating and cooling.

## Declared unit

To produce heating and cooling 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 according to the appropriate usage scenario defined in the EN 14825 standard and during the 17-year reference lifetime of the product.

# Product information

**Reference product:** Platinum BC Mural iR 32 6 MR - reference 7830807

## 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)
<b>SCOP</b> Seasonal coefficient of performance	4.95 (1)	<b>SEER</b> Seasonal cooling efficiency	8.44 (2)
<b>Weight without packaging*</b>	91.8 kg	<b>R32 coolant fluid weight</b>	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

## Constituent materials

Metals		Plastics		Others	
Steel	47.6 %	ABS	4.8 %	Cardboard	7.4 %
Copper	8.8 %	Elastomer	2.0 %	Wood	6.8 %
Aluminium	5.2 %	Polyamide	1.6 %	PCB	1.8 %
Brass	1.7 %	Polypropylene	1.2 %	Bitumen	1.7 %
Ferrite	1.1 %	Polystyrene	0.7 %	R32	1.4 %
Other metals	0.9 %	Other plastics	0.8 %	Other materials	4.5 %
<b>Total</b>	<b>65.3 %</b>		<b>11.1 %</b>		<b>23.6 %</b>

Total weight of the modeled product: 109.6 kg (including 17.8 kg of primary packaging)

# Products cover by this PEP declaration

This PEP declaration covers all the products in the same environmental homogeneous family in electric and hydraulic backup technology for BAXI Italy and BAXI Spain.

## Baxi Spain

Commercial reference	Products references	
	Indoor unit	Outdoor unit
Platinum BC Mural...		
...iR32 4 MR - 7830806	iMPI/E 4-8 iR32 M - 7806037	AWHP2R 4 MR - 7799987
...iR32 6 MR* - 7830807	iMPI/E 4-8 iR32 M - 7806037	AWHP2R 6 MR - 7799991
...iR32 8 MR - 7830808	iMPI/E 8-10 iR32 M - 7806038	AWHP2R 8 MR - 7799992
...iR32 10 MR - 7830809	iMPI/E 8-10 iR32 M - 7806038	AWHP2R 10 MR - 7799993
...iR32 12 MR - 7830810	iMPI/E 12-16 iR32 M - 7806039	AWHP2R 12 MR - 7799995
...iR32 12 TR - 7830812	iMPI/E 12-16 iR32 M - 7806039	AWHP2R 12 TR - 7799997
...iR32 16 MR - 7830811	iMPI/E 12-16 iR32 M - 7806039	AWHP2R 16 MR - 7799996
...iR32 16 TR - 7830813	iMPI/E 12-16 iR32 M - 7806039	AWHP2R 16 TR - 7799998
...Hybrid iR32 12 MR - 7830814	iMPI/H 12-16 iR32 M - 7806040	AWHP2R 12 MR - 7799995
...Hybrid iR32 12 TR - 7830816	iMPI/H 12-16 iR32 M - 7806040	AWHP2R 12 TR - 7799997
...Hybrid iR32 16 MR - 7830815	iMPI/H 12-16 iR32 M - 7806040	AWHP2R 16 MR - 7799996
...Hybrid iR32 16 TR - 7830817	iMPI/H 12-16 iR32 M - 7806040	AWHP2R 16 TR - 7799998

\*Reference product

## Baxi Italy

Commercial reference	Products references	
	Indoor unit	Outdoor unit
ALYA 4M E WH-A	SYSMGR ALYA 4-6M E WH-A - 7806022	AWHP2R 4 MR - 7799987
ALYA 6M E WH-A	SYSMGR ALYA 4-6M E WH-A - 7806022	AWHP2R 6 MR - 7799991
ALYA 8M E WH-A	SYSMGR ALYA 8-10M E WH-A - 7806026	AWHP2R 8 MR - 7799992
ALYA 10M E WH-A	SYSMGR ALYA 8-10M E WH-A - 7806026	AWHP2R 10 MR - 7799993
ALYA 12M E WH-A	SYSMGR ALYA 12-16M E WH-A - 7806027	AWHP2R 12 MR - 7799995
ALYA 12T E WH-A	SYSMGR ALYA 12-16M E WH-A - 7806027	AWHP2R 12 TR - 7799997
ALYA 16M E WH-A	SYSMGR ALYA 12-16M E WH-A - 7806027	AWHP2R 16 MR - 7799996
ALYA 16T E WH-A	SYSMGR ALYA 12-16M E WH-A - 7806027	AWHP2R 16 TR - 7799998

Commercial reference	Products references	
	Indoor unit	Outdoor unit
ALYA 4M H WH-A	SYSMGR ALYA 4-6M H WH-A - 7806031	AWHP2R 4 MR - 7799987
ALYA 6M H WH-A	SYSMGR ALYA 4-6M H WH-A - 7806031	AWHP2R 6 MR - 7799991
ALYA 8M H WH-A	SYSMGR ALYA 8-10M H WH-A - 7806032	AWHP2R 8 MR - 7799992
ALYA 10M H WH-A	SYSMGR ALYA 8-10M H WH-A - 7806032	AWHP2R 10 MR - 7799993
ALYA 12M H WH-A	SYSMGR ALYA 12-16M H WH-A - 7806034	AWHP2R 12 MR - 7799995
ALYA 12T H WH-A	SYSMGR ALYA 12-16M H WH-A - 7806034	AWHP2R 12 TR - 7799997
ALYA 16M H WH-A	SYSMGR ALYA 12-16M H WH-A - 7806034	AWHP2R 16 MR - 7799996
ALYA 16T H WH-A	SYSMGR ALYA 12-16M H WH-A - 7806034	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](http://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

<b>Raw materials and components</b>	The production of 99.6% of the reference product weight (materials, components and packaging), as well as the shaping and assembly processes of the components were taken into account.
<b>Raw materials and components packaging</b>	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.
<b>Manufacturing waste</b>	<p>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.:</p> <ul style="list-style-type: none"> <li>• 005 times for the amount of material for plastic injection processes and elastomer;</li> <li>• 0.3 times for the amount of material for all other materials and other shaping processes.</li> </ul> <p>The default end of life scenario for waste id modelling as follows: 100% of incinerated waste without energy recovery.</p> <p>A transport distance of 100 km is applied for the collection of waste to the treatment centre.</p>
<b>Product manufacturing</b>	<p>The modelling integrates the flows of manufacturing sites (energy, water, consumables of the industrial processes of the production site and the emissions of refrigerant).</p> <ul style="list-style-type: none"> <li>• Internal module is manufactured in MERTZWILLER in France</li> <li>• External module is manufactured in south Asia.</li> </ul>
<b>Transport</b>	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.

The disposal (evacuation and treatment) of the packaging of the reference product and the safety group is modelled according to the **European** scenario below.

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

## Use stage

Electricity consumption is calculated as below:

$$C_{tot} = \left( \frac{Ph}{SCOP * \left(1 + \frac{Fregul}{100}\right)} * t_{calorific} + \frac{Pc}{SEER} * t_{cooling} \right) * RLT$$

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)
- RLT, reference lifetime of the device

(1) Outside air temperature +7°C - water temperature 30/35°C

(2) 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.

**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

<b>Product end of life</b>	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*. <i>*ECOSYSTEM is the organisation in charge of ensuring the extended producer responsibility for WEEE in France.</i>
<b>Refrigerant end of life</b>	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.
<b>Transport</b>	The considered transport to the treatment center is 1000 km for the refrigerant and 100 km for the product.

## Benefits and loads

<b>Loads</b>	Loads related to the use of recycled materials are considered.
<b>Benefits</b>	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
<b>Mandatory indicators</b>												
Climate change - total (IPCC 2013)	kg CO <sub>2</sub> eq.	2.39E+04	8.00E+02	3.97E+01	8.83E+01	2.28E+04	2.22E+02	1.42E+02	2.24E+04	0.00E+00	2.55E+02	-3.40E+02
Climate change - fossil fuels	kg CO <sub>2</sub> eq.	2.39E+04	7.73E+02	3.97E+01	8.40E+01	2.27E+04	2.22E+02	1.42E+02	2.24E+04	0.00E+00	2.49E+02	-3.31E+02
Climate change - biogenics	kg CO <sub>2</sub> eq.	6.81E+01	2.74E+01	0.00E+00	4.22E+00	2.99E+01	0.00E+00	-1.28E-03	2.99E+01	0.00E+00	6.56E+00	-8.82E+00
Climate change - land use and land use transformation	kg CO <sub>2</sub> eq.	1.85E-06	1.85E-06	0.00E+00	3.76E-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.	5.50E-04	2.64E-04	3.52E-05	6.82E-06	2.29E-04	0.00E+00	1.33E-04	9.57E-05	0.00E+00	1.47E-05	5.93E-05
Acidification (AP)	kg H <sup>+</sup> eq.	1.37E+02	6.83E+00	1.79E-01	7.01E-01	1.28E+02	0.00E+00	5.71E-01	1.28E+02	0.00E+00	1.18E+00	-8.67E+00
Freshwater eutrophication	kg P eq.	6.91E-02	4.02E-03	4.67E-06	4.59E-04	6.13E-02	0.00E+00	1.45E-05	6.13E-02	0.00E+00	3.27E-03	-8.12E-01
Marine aquatic eutrophication	kg N eq.	1.61E+01	7.08E-01	8.28E-02	4.59E-04	1.47E+01	0.00E+00	1.79E-01	1.45E+01	0.00E+00	5.73E-01	-6.55E-01
Terrestrial eutrophication	mol N eq.	2.31E+02	7.59E+00	8.97E-01	7.46E-01	2.20E+02	0.00E+00	2.23E+00	2.18E+02	0.00E+00	1.35E+00	-6.71E+00
Photochemical ozone formation	kg NMVOC eq.	5.10E+01	2.59E+00	2.91E-01	2.43E-01	4.75E+01	0.00E+00	9.17E-01	4.66E+01	0.00E+00	4.01E-01	-2.02E+00
Abiotic resource depletion - metals and minerals	kg SB eq.	6.61E-02	6.14E-02	3.43E-09	2.77E-03	1.62E-03	0.00E+00	1.70E-07	1.62E-03	0.00E+00	3.07E-04	-3.46E-02
Abiotic resource depletion - fossils	MJ	6.01E+05	2.61E+04	4.84E+02	8.96E+02	5.72E+05	0.00E+00	1.46E+03	5.70E+05	0.00E+00	2.08E+03	-8.72E+02
Water requirement	m <sup>3</sup>	3.46E+04	3.20E+02	2.02E+00	3.53E+01	7.53E+02	0.00E+00	8.17E+00	7.45E+02	0.00E+00	3.35E+04	-1.54E+05
<b>Optional indicators</b>												
Emission of fine particles	Disease occurrence	1.05E-03	4.50E-05	4.82E-07	4.70E-06	9.93E-04	0.00E+00	2.25E-06	9.91E-04	0.00E+00	6.61E-06	-2.93E-05
Ionizing radiation, human health	kg U235 eq.	4.57E+04	1.09E+04	8.84E-02	1.52E+03	3.33E+04	0.00E+00	6.24E-01	3.33E+04	0.00E+00	1.39E+01	-6.00E+01
Ecotoxicity (freshwater)	CTUe	3.21E+05	5.46E+04	1.63E+02	3.03E+03	2.42E+05	9.70E-03	5.08E+02	2.41E+05	0.00E+00	2.13E+04	-6.71E+04
Human toxicity, carcinogenic effects	CTUh	3.67E-04	3.17E-04	4.54E-10	4.77E-05	2.63E-06	0.00E+00	1.88E-08	2.61E-06	0.00E+00	1.12E-07	1.35E-05
Human toxicity, non-carcinogenic effects	CTUh	1.70E-04	4.89E-05	1.01E-07	5.13E-06	1.08E-04	2.29E-10	4.72E-06	1.04E-04	0.00E+00	7.46E-06	-9.01E-05
Impacts related to land use/soil quality	-	7.67E+02	8.13E+00	0.00E+00	5.62E+00	4.45E+02	0.00E+00	0.00E+00	4.45E+02	0.00E+00	3.08E+02	-1.75E+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 A-C	Manufacturing A1-A3	Distribution A4	Installation A5	Use					End of life C1-C4	Benefits and loads D
						B1-B7	B1	B2	B6	B3-B5,B7		
<b>Resource use indicators</b>												
Total use of primary energy during the life cycle	MJ	7.12E+05	2.68E+04	4.84E+02	9.91E+02	6.81E+05	0.00E+00	1.46E+03	6.80E+05	0.00E+00	2.25E+03	-1.88E+03
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	1.10E+05	4.06E+02	3.24E-03	6.70E+01	1.10E+05	0.00E+00	2.35E-02	1.10E+05	0.00E+00	1.67E+02	-8.46E+02
Use of renewable primary energy resources used as raw materials	MJ	3.25E+02	2.98E+02	0.00E+00	2.77E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.60E+02
Total use of renewable primary energy resources	MJ	1.10E+05	7.04E+02	3.24E-03	9.46E+01	1.10E+05	0.00E+00	2.35E-02	1.10E+05	0.00E+00	1.67E+02	-1.01E+03
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	6.01E+05	2.54E+04	4.84E+02	8.90E+02	5.72E+05	0.00E+00	1.45E+03	5.70E+05	0.00E+00	2.08E+03	-1.30E+03
Use of non-renewable primary energy resources used as raw materials	MJ	6.62E+02	6.43E+02	0.00E+00	5.82E+00	1.33E+01	0.00E+00	1.33E+01	0.00E+00	0.00E+00	0.00E+00	4.23E+02
Total use of non-renewable primary energy resources	MJ	6.01E+05	2.61E+04	4.84E+02	8.96E+02	5.72E+05	0.00E+00	1.46E+03	5.70E+05	0.00E+00	2.08E+03	-8.72E+02
<b>Use of secondary materials, water and energy resources</b>												
Use of secondary materials	kg	1.15E+01	1.15E+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 <sup>3</sup>	1.32E+02	6.40E+00	4.71E-02	6.01E-01	1.85E+01	0.00E+00	1.90E-01	1.83E+01	0.00E+00	1.07E+02	-1.57E+03
<b>Waste category indicators</b>												
Hazardous waste disposed	kg	2.83E+03	2.15E+03	3.30E-02	2.56E+02	4.19E+02	0.00E+00	2.39E-01	4.18E+02	0.00E+00	2.08E-04	2.23E+02
Non hazardous waste disposed	kg	3.90E+03	4.88E+02	4.06E-02	1.92E+02	3.22E+03	0.00E+00	1.04E+00	3.22E+03	0.00E+00	1.40E+00	-1.00E+02
Radioactive waste disposed	kg	9.73E-01	2.08E-01	7.93E-03	6.00E-02	6.97E-01	0.00E+00	2.28E-02	6.74E-01	0.00E+00	3.78E-05	-7.60E-03
<b>Output flow indicators</b>												
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	1.02E+02	5.90E+00	0.00E+00	1.32E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.34E+01	0.00E+00
Materials for energy recovery	kg	1.77E+01	1.50E+00	0.00E+00	5.56E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.18E+01	0.00E+00
Exported Energy	MJ	6.66E+00	1.78E+00	0.00E+00	4.88E+00	0.00E+00	0.00E+00	0.00E+00	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 (assessment methodology 0/0)

- Biogenic carbon content of the product: 0.00E+00 kg C
- Biogenic carbon content of the associated packaging: 5.56E+00 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 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 A-C	Manufacturing A1-A3	Distribution A4	Installation A5	Use					End of life C1-C4	Benefits and loads D
						B1-B7	B1	B2	B6	B3-B5,B7		
<b>Mandatory indicators</b>												
Climate change - total (IPCC 2013)	kg CO <sub>2</sub> eq.	3.53E+03	1.18E+02	5.85E+00	1.30E+01	3.35E+03	3.27E+01	2.09E+01	3.30E+03	0.00E+00	3.76E+01	-5.01E+01
Climate change - fossil fuels	kg CO <sub>2</sub> eq.	3.52E+03	1.14E+02	5.85E+00	1.24E+01	3.35E+03	3.27E+01	2.09E+01	3.29E+03	0.00E+00	3.66E+01	-4.88E+01
Climate change - biogenics	kg CO <sub>2</sub> eq.	1.00E+01	4.04E+00	0.00E+00	6.22E-01	4.40E+00	0.00E+00	-1.89E-04	4.40E+00	0.00E+00	9.66E-01	-1.30E+00
Climate change - land use and land use transformation	kg CO <sub>2</sub> eq.	2.73E-07	2.73E-07	0.00E+00	5.54E-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.	8.10E-05	3.89E-05	5.18E-06	1.00E-06	3.37E-05	0.00E+00	1.96E-05	1.41E-05	0.00E+00	2.17E-06	8.73E-06
Acidification (AP)	kg H <sup>+</sup> eq.	2.02E+01	1.01E+00	2.64E-02	1.03E-01	1.89E+01	0.00E+00	8.40E-02	1.88E+01	0.00E+00	1.74E-01	-1.28E+00
Freshwater eutrophication	kg P eq.	1.02E-02	5.93E-04	6.88E-07	6.76E-05	9.03E-03	0.00E+00	2.13E-06	9.03E-03	0.00E+00	4.82E-04	-1.20E-01
Marine aquatic eutrophication	kg N eq.	2.36E+00	1.04E-01	1.22E-02	6.76E-05	2.16E+00	0.00E+00	2.63E-02	2.14E+00	0.00E+00	8.44E-02	-9.64E-02
Terrestrial eutrophication	mol N eq.	3.40E+01	1.12E+00	1.32E-01	1.10E-01	3.24E+01	0.00E+00	3.28E-01	3.21E+01	0.00E+00	1.98E-01	-9.89E-01
Photochemical ozone formation	kg NMVOC eq.	7.52E+00	3.81E-01	4.29E-02	3.57E-02	7.00E+00	0.00E+00	1.35E-01	6.86E+00	0.00E+00	5.91E-02	-2.98E-01
Abiotic resource depletion - metals and minerals	kg SB eq.	9.73E-03	9.04E-03	5.05E-10	4.08E-04	2.39E-04	0.00E+00	2.51E-08	2.39E-04	0.00E+00	4.52E-05	-5.10E-03
Abiotic resource depletion - fossils	MJ	8.86E+04	3.84E+03	7.13E+01	1.32E+02	8.42E+04	0.00E+00	2.16E+02	8.40E+04	0.00E+00	3.06E+02	-1.28E+02
Water requirement	m <sup>3</sup>	5.09E+03	4.71E+01	2.98E-01	5.20E+00	1.11E+02	0.00E+00	1.20E+00	1.10E+02	0.00E+00	4.93E+03	-2.26E+04
<b>Optional indicators</b>												
Emission of fine particles	Disease occurrence	1.55E-04	6.63E-06	7.10E-08	6.92E-07	1.46E-04	0.00E+00	3.32E-07	1.46E-04	0.00E+00	9.73E-07	-4.31E-06
Ionizing radiation, human health	kg U235 eq.	6.74E+03	1.61E+03	1.30E-02	2.24E+02	4.90E+03	0.00E+00	9.19E-02	4.90E+03	0.00E+00	2.05E+00	-8.84E+00
Ecotoxicity (freshwater)	CTUe	4.72E+04	8.05E+03	2.40E+01	4.47E+02	3.56E+04	1.43E-03	7.48E+01	3.55E+04	0.00E+00	3.14E+03	-9.88E+03
Human toxicity, carcinogenic effects	CTUh	5.41E-05	4.67E-05	6.69E-11	7.02E-06	3.87E-07	0.00E+00	2.76E-09	3.85E-07	0.00E+00	1.65E-08	1.99E-06
Human toxicity, non-carcinogenic effects	CTUh	2.50E-05	7.21E-06	1.49E-08	7.56E-07	1.59E-05	3.37E-11	6.96E-07	1.53E-05	0.00E+00	1.10E-06	-1.33E-05
Impacts related to land use/soil quality	-	1.13E+02	1.20E+00	0.00E+00	8.28E-01	6.56E+01	0.00E+00	0.00E+00	6.56E+01	0.00E+00	4.53E+01	-2.58E+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 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.

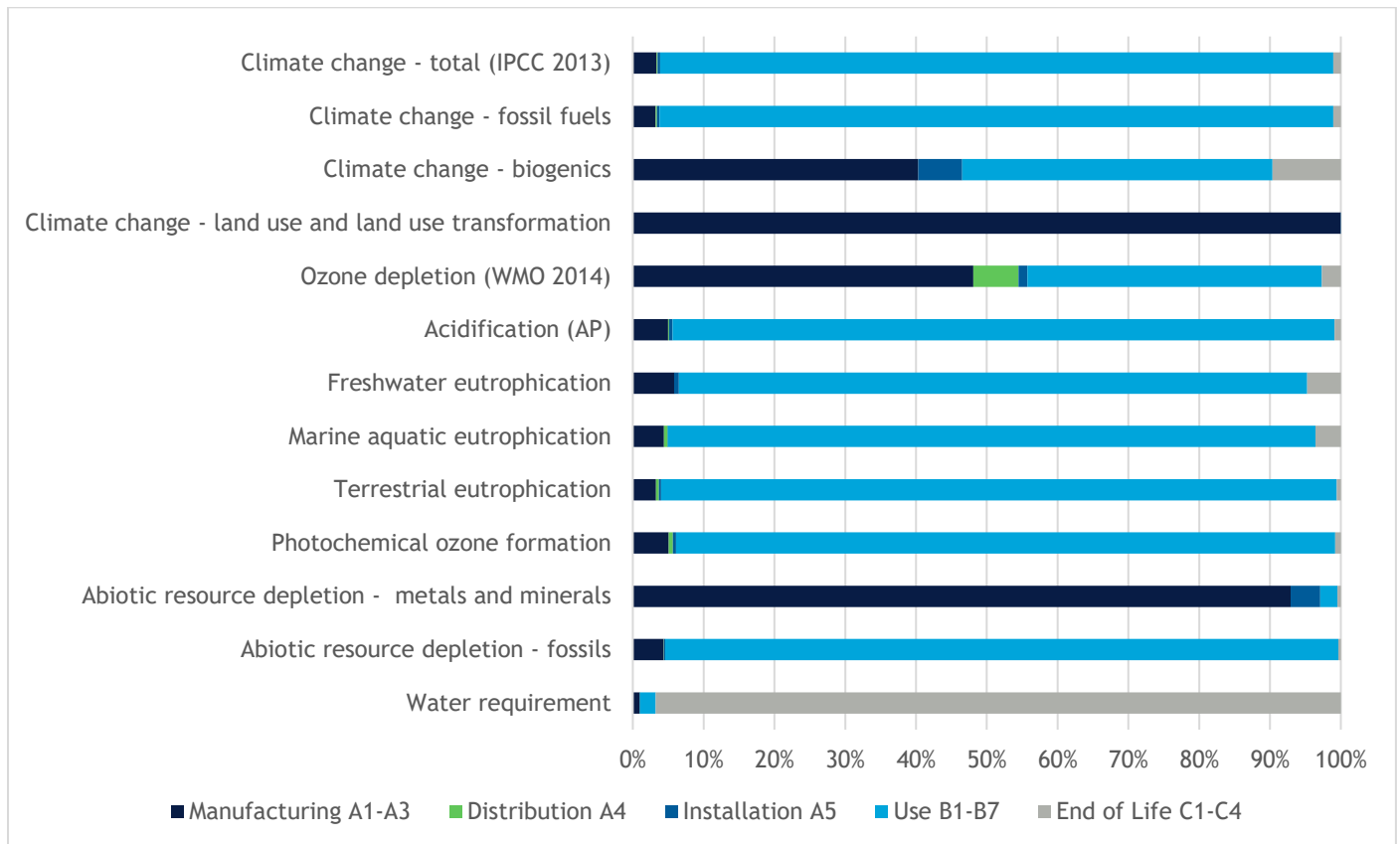
Impact indicators	Unit	Total A-C	Manufacturing A1-A3	Distribution A4	Installation A5	Use					End of life C1-C4	Benefits and loads D
						B1-B7	B1	B2	B6	B3-B5,B7		
<b>Resource use indicators</b>												
Total use of primary energy during the life cycle	MJ	1.05E+05	3.94E+03	7.13E+01	1.46E+02	1.00E+05	0.00E+00	2.16E+02	1.00E+05	0.00E+00	3.31E+02	-2.76E+02
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	1.62E+04	5.99E+01	4.78E-04	9.87E+00	1.61E+04	0.00E+00	3.46E-03	1.61E+04	0.00E+00	2.47E+01	-1.25E+02
Use of renewable primary energy resources used as raw materials	MJ	4.79E+01	4.39E+01	0.00E+00	4.07E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.35E+01
Total use of renewable primary energy resources	MJ	1.63E+04	1.04E+02	4.78E-04	1.39E+01	1.61E+04	0.00E+00	3.46E-03	1.61E+04	0.00E+00	2.47E+01	-1.48E+02
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	8.85E+04	3.74E+03	7.13E+01	1.31E+02	8.42E+04	0.00E+00	2.14E+02	8.40E+04	0.00E+00	3.06E+02	-1.91E+02
Use of non-renewable primary energy resources used as raw materials	MJ	9.75E+01	9.47E+01	0.00E+00	8.58E-01	1.96E+00	0.00E+00	1.96E+00	0.00E+00	0.00E+00	0.00E+00	6.24E+01
Total use of non-renewable primary energy resources	MJ	8.86E+04	3.84E+03	7.13E+01	1.32E+02	8.42E+04	0.00E+00	2.16E+02	8.40E+04	0.00E+00	3.06E+02	-1.28E+02
<b>Use of secondary materials, water and energy resources</b>												
Use of secondary materials	kg	1.69E+00	1.69E+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 <sup>3</sup>	1.95E+01	9.42E-01	6.94E-03	8.85E-02	2.73E+00	0.00E+00	2.80E-02	2.70E+00	0.00E+00	1.57E+01	-2.31E+02
<b>Waste category indicators</b>												
Hazardous waste disposed	kg	4.17E+02	3.17E+02	4.86E-03	3.76E+01	6.16E+01	0.00E+00	3.51E-02	6.16E+01	0.00E+00	3.07E-05	3.29E+01
Non hazardous waste disposed	kg	5.75E+02	7.19E+01	5.98E-03	2.83E+01	4.75E+02	0.00E+00	1.54E-01	4.74E+02	0.00E+00	2.07E-01	-1.48E+01
Radioactive waste disposed	kg	1.43E-01	3.07E-02	1.17E-03	8.84E-03	1.03E-01	0.00E+00	3.36E-03	9.93E-02	0.00E+00	5.57E-06	-1.12E-03
<b>Output flow indicators</b>												
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	1.51E+01	8.69E-01	0.00E+00	1.94E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.23E+01	0.00E+00
Materials for energy recovery	kg	2.61E+00	2.20E-01	0.00E+00	8.19E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.74E+00	0.00E+00
Exported Energy	MJ	9.81E-01	2.63E-01	0.00E+00	7.19E-01	0.00E+00	0.00E+00	0.00E+00	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

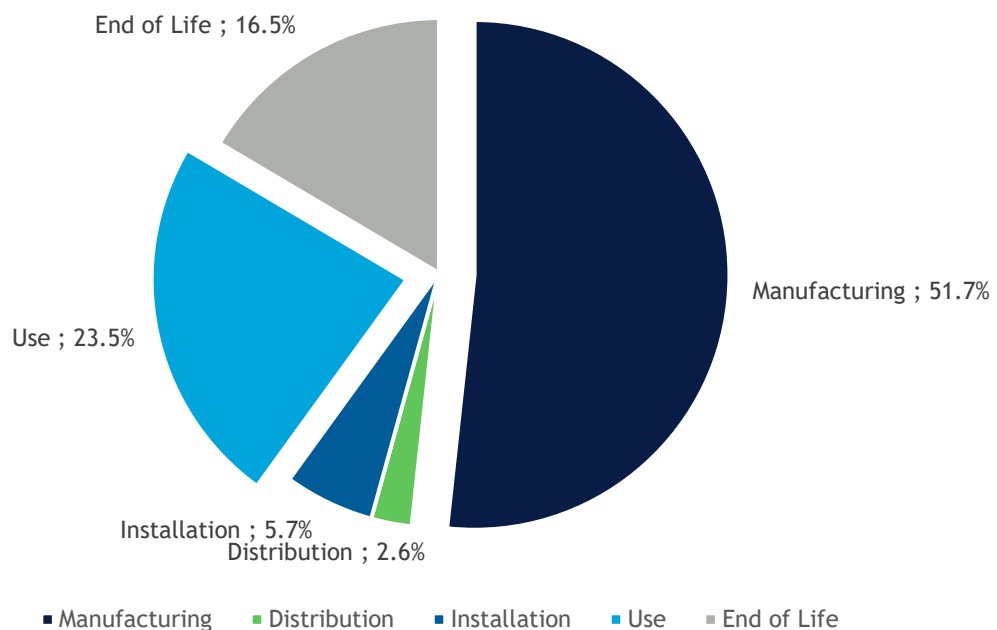
### Biogenic carbon content (assessment methodology 0/0)

- Biogenic carbon content of the product: 0.00E+00 kg C
- Biogenic carbon content of the associated packaging: 8.19+-01 kg C

# Distribution of environmental impacts



Climate change (without B6 module - energy requirements)



# 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	$\frac{\text{Mass of product considered} + \text{Mass of packaging of the product considered (kg)}}{\text{Mass of the reference product} + \text{Mass of packaging of the reference product (kg)}}$
Distribution	$\frac{\text{Mass of product considered} + \text{Mass of packaging of the product considered (kg)}}{\text{Mass of the reference product} + \text{Mass of packaging of the reference product (kg)}}$
Installation	$\frac{\text{Mass of packaging of the product considered (kg)}}{\text{Mass of packaging of the reference product (kg)}}$
Use - Emissions	1
Use - Maintenance	1
Use - Energy consumption	$\frac{\text{Total energy consumption of the product considered (kWh)}}{\text{Total energy consumption of the reference product (kWh)}}$
End of life	$\frac{\text{Mass of the product considered (kg)}}{\text{Mass of the reference product (kg)}}$
Benefits and loads	$\frac{\text{Mass of product considered} + \text{Mass of packaging of the product considered (kg)}}{\text{Mass of the reference product} + \text{Mass of packaging of the reference product (kg)}}$
Biogenic carbon content of the associated packaging	$\frac{\text{Mass of packaging of the product considered (kg)}}{\text{Mass of packaging of the reference product (kg)}}$

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.

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

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 Platinum BC Mural... ALYA...	Weight <sup>(1)</sup> (kg)		Capacity <sup>(2)</sup> (kW)	Total electricity consumption (kWh)
	Product	Packaging		
...iR32 4 MR ...4M E WH A	91.8	17.8	5.32	43781
...iR32 6 MR ...6M E WH A	91.8	17.8	6.79	54626
...iR32 8 MR ...8M E WH A	110.8	19.0	8.20	63339
...iR32 10 MR ...10M E WH A	110.8	19.0	9.41	72979
...iR32 12 MR ...12M E WH A	133.5	19.0	11.72	106153
...iR32 12 TR ...12T E WH A	148.5	19.0	11.72	106153
...iR32 16 MR ...16M E WH A	133.5	19.0	14.40	133311
...iR32 16 TR ...16T E WH A	148.5	19.0	14.40	133311
...4M H WH-A	85.5	17.8	5.32	43781
...6M H WH-A	85.5	17.8	6.79	54626
...8M H WH-A	105.0	19.0	8.20	63339
...10M H WH-A	105.0	19.0	9.41	72979
...Hybrid iR32 12 MR ...12M H WH-A	128.0	19.0	11.72	106153
...Hybrid iR32 12 TR ...12T H WH-A	143.0	19.0	11.72	106153
...Hybrid iR32 16 MR ...16M H WH-A	128.0	19.0	14.40	133311
...Hybrid iR32 16 TR ...16T H WH-A	143.0	19.0	14.40	133311

(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 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 Mural iR32...	...4 MR	...6 MR	...8 MR	...10 MR	...12 MR	...12 TR	...16 MR	...16 TR
ALYA... ...WH A	...4M E...	...6M E	...8M E	...10M E	...12M E	...12T E	...16M E	...16T E
Manufacturing	1.000	1.000	1.185	1.185	1.392	1.529	1.392	1.529
Distribution	1.000	1.000	1.185	1.185	1.392	1.529	1.392	1.529
Installation	1.000	1.000	1.068	1.068	1.068	1.068	1.068	1.068
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	0.801	1.000	1.160	1.336	1.943	1.943	2.440	2.440
End of life	1.000	1.000	1.208	1.208	1.455	1.618	1.455	1.618
Benefits and loads	1.000	1.000	1.185	1.185	1.392	1.529	1.392	1.529

### Hydraulic backup

Platinum BC Mural Hybrid iR32...					...12 MR	...12 TR	...16 MR	...16 TR
ALYA... ...WH A	...4M H...	...6M H	...8M H	...10M H	...12M H	...12T H	...16M H	...16T H
Manufacturing	0.942	0.942	1.132	1.132	1.342	1.479	1.342	1.479
Distribution	0.942	0.942	1.132	1.132	1.342	1.479	1.342	1.479
Installation	1.000	1.000	1.068	1.068	1.068	1.068	1.068	1.068
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	0.801	1.000	1.160	1.336	1.943	1.943	2.440	2.440
End of life	0.931	0.931	1.144	1.144	1.395	1.558	1.395	1.558
Benefits and loads	0.942	0.942	1.132	1.132	1.342	1.479	1.342	1.479

## Further information

For any other additional information on the PEP, please contact us at [PEP-HP@BDRThermea.com](mailto:PEP-HP@BDRThermea.com)