


## Product Environmental Profile

Air/Water Heater pump

Baxi HP40 Monobloc ASHP  
Baxi Assure HP50 Monobloc ASHP



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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

Air-water heat pump monobloc for heating.

## Declared unit

To produce heating with an air-to-water heat pump of 5.7 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 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: HP40-5-1 PHMB - reference 7830575

## Technical characteristics of the reference product

<b>P<sub>designh</sub></b> <i>Design load for heating</i>	5.7 kW <sup>(1)</sup>	<b>SCOP</b> <i>Seasonal coefficient of performance</i>	3.52 <sup>(1)</sup>
<b>Product Weight</b> <i>without packaging</i>	94.8 kg <sup>(2)</sup>	<b>R32 coolant fluid weight</b>	1.4 kg

(1) According to EN 14825 - outside air temperature +7°C - water temperature 47/55°C

(2) 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.

## Constituent materials

Metals		Plastics		Others	
Steel	48.9 %	Acrylonitrile Butadiene Styrene (ABS)	1.9 %	Wood	11.3 %
Copper	8.2 %	Polyamide	1.4 %	Cardboard	7.4 %
Aluminium	6.1 %	Polyethylene	0.9 %	Electronic components	1.9 %
Brass	2.3 %	Elastomer	0.7 %	Polyester fibern	1.5 %
Ferrite	1.0 %	Polypropylene	0.2 %	Refrigerant R32	1.2 %
Other metals	0.7 %	Other plastics	0.4 %	Other materials	4.1 %
<b>Total</b>	<b>67.2 %</b>		<b>5.5 %</b>		<b>27.3 %</b>

Total weight of the modeled product: 119.0 kg (including 24.2 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 UK	Baxi Assure
HP40-4-1 PHMB - 7830576	HP50-4-1 PHMB - 7830577
HP40-5-1 PHMB - 7830575	HP50-5-1 PHMB - 7830578
HP40-7-1 PHMB - 7830574	HP50-7-1 PHMB - 7830579
HP40-8-1 PHMB - 7830573	HP50-8-1 PHMB - 7830580
HP40-11-1 PHMB - 7830572	HP50-11-1 PHMB - 7830581
HP40-13-1 PHMB - 7830571	HP50-13-1 PHMB - 7830582
HP40-11-3 PHMB - 7830570	HP50-11-3 PHMB - 7830583
HP40-13-3 PHMB - 7830568	HP50-13-3 PHMB - 7830584

\*Reference product

## 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 99.9% of the reference product weight (materials, components and packaging), as well as the shaping and assembly processes of the components were taken into account.
<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>• External module is manufactured in south Asia.</li> <li>• Some parts (magnetic filter, manuals, overpackaging) are produce in Europe (France and UK).</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. We also considered the transport of the sub-assembly including the manuals and the control box, from the assembly site in France to the assembly site in the United Kingdom.
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## Distribution stage

<b>Transport</b>	The distribution stage includes the transport by truck of the packaged product over a distance of 1000 km from our last logistics platforms to the distributor, then to the place of implementation in United Kingdom. No reconditioning packaging was considered.
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## Installation stage

<b>Accessory</b>	The installation phase includes a floor installation support: we modeled material and production scrap, shaping process, packaging, end of life of scrap and transport to the place of implementation. A concrete slab is also modeled. No additional refrigerant charge was considered during the installation stage.
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<b>Packaging waste</b>	The disposal (evacuation and treatment) of the packaging of the reference product and the safety group is modelled according to the <b>European</b> scenario below.			
		Cardboard & Papers	Wood	Plastics
	Recycling	82%	31%	41%
	Energy recovery	9%	31%	37%
	Not recovered (100% buried)	9%	38%	22%

## Use stage

<b>Electricity consumption</b>	<p>Electricity consumption is calculated as below:</p> $C_{tot} = \left( \frac{Ph}{SCOP * \left(1 + \frac{Fregul}{100}\right)} * t_{calorific} \right) * RLT$ <p>With:</p> <ul style="list-style-type: none"> <li>• Ctot expressed in kWh</li> <li>• SCOP, seasonal coefficient of performance defined according to EN 14825*</li> <li>• Fregul= 4, default setting for the water heating application</li> <li>• Tcalorific, equivalent annual operating hours of the unit in active heating mode.</li> <li>• Ph = Pdesignh, heat load according to regulation n° 813/2013*</li> <li>• RLT, reference lifetime of the device</li> </ul> <p>*Outside air temperature +7°C - water temperature 47/55°C</p> <p>The electrical energy model considered for European use is: Electricity Mix; Production mix; Low voltage; UK, (reference year: 2018)</p>
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<b>Maintenance</b>	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.
<b>Refrigerant leaks</b>	The leak of R32 refrigerant into the air, and its refill (including production of new refrigerant and transport) are considered.

## End of life stage

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<b>Product end of life</b>	For the end-of-life treatment of the product, we considered the end-of-life scenario in accordance with the PCR (appendix D).
<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.

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## Benefits and loads

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<b>Loads</b>	Loads related to the use of recycled materials are considered.
<b>Benefits</b>	Only the benefits related to the recycling of the packaging (at installation stage) and the product (at end-of-life stage) are considered, using the end-of-life scenario of PCR - annex D.

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*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	Manuf.	Distrib.	Install.	Use					End of life				Benefits & loads D	
		A-C	A1-A3	A4	A5	B1-B7	B1	B2	B6	B3-B5,B7	C1-C4	C1	C2	C3		C4
<b>Mandatory indicators</b>																
Climate change - total (IPCC 2013)	kg CO <sub>2</sub> eq.	1.60E+04	1.01E+03	1.17E+01	1.17E+02	1.45E+04	4.17E+01	1.27E+02	1.44E+04	0.00E+00	3.13E+02	1.14E+02	1.25E+00	1.95E+02	2.16E+00	-2.17E+02
Climate change - fossil fuels	kg CO <sub>2</sub> eq.	1.59E+04	9.77E+02	1.17E+01	1.12E+02	1.45E+04	4.17E+01	1.27E+02	1.43E+04	0.00E+00	3.11E+02	1.14E+02	1.25E+00	1.93E+02	2.07E+00	-2.13E+02
Climate change - biogenics	kg CO <sub>2</sub> eq.	5.97E+01	3.56E+01	0.00E+00	4.80E+00	1.69E+01	0.00E+00	0.00E+00	1.69E+01	0.00E+00	2.41E+00	0.00E+00	0.00E+00	2.32E+00	9.11E-02	-3.85E+00
Climate change - land use and land use transformation	kg CO <sub>2</sub> eq.	3.36E-05	5.70E-07	0.00E+00	5.85E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.24E-05	0.00E+00	0.00E+00	3.24E-05	0.00E+00	0.00E+00
Ozone depletion (WMO 2014)	kg CFC-11 eq.	3.91E-04	2.33E-04	1.04E-05	8.40E-06	1.37E-04	0.00E+00	1.00E-04	3.69E-05	0.00E+00	2.70E-06	0.00E+00	1.11E-06	1.55E-06	3.99E-08	8.92E-05
Acidification (AP)	kg H+ eq.	7.75E+01	8.70E+00	5.28E-02	5.40E-01	6.75E+01	0.00E+00	5.39E-01	6.69E+01	0.00E+00	7.03E-01	0.00E+00	5.63E-03	6.92E-01	5.64E-03	-2.30E+00
Freshwater eutrophication	kg P eq.	1.11E-01	2.85E-03	1.38E-06	4.58E-04	4.94E-02	0.00E+00	1.41E-05	4.94E-02	0.00E+00	5.86E-02	0.00E+00	1.47E-07	5.80E-02	5.34E-04	-4.30E-04
Marine aquatic eutrophication	kg N eq.	9.08E+00	9.81E-01	2.44E-02	4.58E-04	7.96E+00	0.00E+00	1.76E-01	7.78E+00	0.00E+00	1.15E-01	0.00E+00	2.60E-03	1.10E-01	2.06E-03	-1.40E-01
Terrestrial eutrophication	mol N eq.	2.17E+02	1.04E+01	2.64E-01	1.04E+00	2.04E+02	0.00E+00	2.20E+00	2.02E+02	0.00E+00	1.31E+00	0.00E+00	2.82E-02	1.27E+00	1.59E-02	-1.48E+00
Photochemical ozone formation	kg NMVOC eq.	2.61E+01	3.37E+00	8.58E-02	3.12E-01	2.19E+01	0.00E+00	9.08E-01	2.10E+01	0.00E+00	4.28E-01	0.00E+00	9.14E-03	4.14E-01	4.73E-03	-3.65E-01
Abiotic resource depletion - metals and minerals	kg SB eq.	4.78E-02	4.45E-02	1.01E-09	4.44E-06	1.63E-03	0.00E+00	2.20E-08	1.63E-03	0.00E+00	1.68E-03	0.00E+00	1.08E-10	1.68E-03	9.13E-08	-4.05E-02
Abiotic resource depletion - fossils	MJ	4.59E+05	3.00E+04	1.43E+02	1.17E+03	4.18E+05	0.00E+00	1.44E+03	4.17E+05	0.00E+00	1.00E+04	0.00E+00	1.52E+01	1.00E+04	1.03E+01	2.35E+03
Water requirement	m <sup>3</sup>	7.22E+02	3.66E+02	5.96E-01	2.19E+01	2.46E+02	0.00E+00	6.36E+00	2.40E+02	0.00E+00	8.72E+01	0.00E+00	6.35E-02	8.62E+01	9.24E-01	-4.66E+01
<b>Optional indicators</b>																
Emission of fine particles	Disease occurrence	6.87E-04	4.99E-05	1.42E-07	3.96E-06	6.29E-04	0.00E+00	2.08E-06	6.27E-04	0.00E+00	3.62E-06	0.00E+00	1.51E-08	3.57E-06	3.17E-08	-1.39E-05
Ionizing radiation, human health	kg U235 eq.	3.94E+04	1.13E+04	2.60E-02	1.29E+03	2.67E+04	0.00E+00	5.54E-01	2.67E+04	0.00E+00	2.63E+00	0.00E+00	2.78E-03	2.57E+00	5.84E-02	-2.10E+03
Ecotoxicity (freshwater)	CTUe	1.66E+05	8.27E+04	4.81E+01	3.37E+03	7.10E+04	1.82E-03	4.84E+02	7.05E+04	0.00E+00	8.62E+03	4.99E-03	5.13E+00	8.34E+03	2.81E+02	-5.59E+03
Human toxicity, carcinogenic effects	CTUh	3.35E-04	3.26E-04	1.34E-10	7.77E-06	1.21E-06	0.00E+00	1.13E-08	1.20E-06	0.00E+00	9.90E-08	0.00E+00	1.43E-11	9.68E-08	2.16E-09	-1.64E-04
Human toxicity, non-carcinogenic effects	CTUh	1.03E-04	5.64E-05	2.97E-08	6.06E-07	3.81E-05	4.29E-11	4.67E-06	3.34E-05	0.00E+00	7.52E-06	1.18E-10	3.17E-09	7.47E-06	4.66E-08	-4.60E-05
Impacts related to land use/soil quality	-	7.56E+02	1.85E+00	0.00E+00	8.06E+00	6.02E+02	0.00E+00	0.00E+00	6.02E+02	0.00E+00	1.44E+02	0.00E+00	0.00E+00	1.44E+02	0.00E+00	-2.34E-01

A1-A3 Manufacturing; A4 Distribution; A5 Installation; B1 Use; B2 Maintenance; B3 Repair; B4 Replacement; B5 Restoration; B6 Energy requirements; B7 Water requirements; C1 Deinstallation; C2 Transport; C3 Recovery and/or recycling; C4 Disposal; D Benefits & loads beyond the system boundaries

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

Inventory flow indicators	Unit	Total A-C	Manuf. A1-A3	Distrib. A4	Install A5	Use					End of life				Benefits & loads D	
						B1-B7	B1	B2	B6	B3-B5,B7	C1-C4	C1	C2	C3		C4
<b>Resource use indicators</b>																
Total use of primary energy during the life cycle	MJ	5.88E+05	3.07E+04	1.43E+02	1.28E+03	5.45E+05	0.00E+00	1.44E+03	5.44E+05	0.00E+00	1.01E+04	0.00E+00	1.52E+01	1.00E+04	1.08E+01	2.14E+03
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	1.28E+05	1.97E+02	9.55E-04	9.79E+01	1.27E+05	0.00E+00	2.04E-02	1.27E+05	0.00E+00	3.77E+01	0.00E+00	1.02E-04	3.72E+01	5.22E-01	1.90E+01
Use of renewable primary energy resources used as raw materials	MJ	5.77E+02	5.63E+02	0.00E+00	1.42E+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	0.00E+00	-2.34E+02
Total use of renewable primary energy resources	MJ	1.28E+05	7.60E+02	9.55E-04	1.12E+02	1.27E+05	0.00E+00	2.04E-02	1.27E+05	0.00E+00	3.77E+01	0.00E+00	1.02E-04	3.72E+01	5.22E-01	-2.15E+02
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	4.59E+05	2.95E+04	1.43E+02	1.16E+03	4.18E+05	0.00E+00	1.44E+03	4.17E+05	0.00E+00	1.00E+04	0.00E+00	1.52E+01	1.00E+04	1.03E+01	1.66E+03
Use of non-renewable primary energy resources used as raw materials	MJ	4.43E+02	4.42E+02	0.00E+00	6.11E-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	0.00E+00	6.88E+02
Total use of non-renewable primary energy resources	MJ	4.59E+05	3.00E+04	1.43E+02	1.17E+03	4.18E+05	0.00E+00	1.44E+03	4.17E+05	0.00E+00	1.00E+04	0.00E+00	1.52E+01	1.00E+04	1.03E+01	2.35E+03
<b>Use of secondary materials, water and energy resources</b>																
Use of secondary materials	kg	2.36E-03	2.36E-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	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	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of freshwater	m <sup>3</sup>	1.53E+01	6.94E+00	1.39E-02	3.09E-01	5.86E+00	0.00E+00	1.48E-01	5.71E+00	0.00E+00	2.18E+00	0.00E+00	1.48E-03	2.18E+00	1.60E-04	-5.62E-01
<b>Waste category indicators</b>																
Hazardous waste disposed	kg	2.31E+03	2.13E+03	9.73E-03	2.71E+00	1.72E+02	0.00E+00	1.73E-01	1.72E+02	0.00E+00	2.83E+00	0.00E+00	1.04E-03	3.97E-01	2.44E+00	-1.08E+03
Non hazardous waste disposed	kg	1.98E+03	7.51E+02	1.20E-02	2.15E+02	9.52E+02	0.00E+00	2.30E-01	9.52E+02	0.00E+00	5.95E+01	0.00E+00	1.27E-03	2.08E+01	3.87E+01	-2.81E+02
Radioactive waste disposed	kg	4.91E-01	2.14E-01	2.33E-03	8.95E-02	1.81E-01	0.00E+00	2.28E-02	1.58E-01	0.00E+00	4.57E-03	0.00E+00	2.49E-04	3.72E-03	6.02E-04	-6.78E-02
<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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	7.66E+01	2.45E-01	0.00E+00	1.32E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.31E+01	0.00E+00	0.00E+00	6.31E+01	0.00E+00	0.00E+00
Materials for energy recovery	kg	2.18E+01	1.76E+00	0.00E+00	5.41E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.46E+01	0.00E+00	0.00E+00	1.46E+01	0.00E+00	0.00E+00
Exported Energy	MJ	6.47E+00	1.28E+00	0.00E+00	4.90E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.94E-01	0.00E+00	0.00E+00	0.00E+00	2.94E-01	0.00E+00

A1-A3 Manufacturing; A4 Distribution; A5 Installation; B1 Use; B2 Maintenance; B3 Repair; B4 Replacement; B5 Restoration; B6 Energy requirements; B7 Water requirements; C1 Deinstallation; C2 Transport; C3 Recovery and/or recycling; C4 Disposal; D Benefits & loads beyond the system boundaries

### 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: 8.24E+00 kg C

## Environmental impacts per kW, corresponding to the functional unit

The PEP was drawn up under the assumption 1 kW of heating 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 capacity of 5.7 kW.

Impact indicators	Unit	Total	Manuf.	Distrib.	Install.	Use					End of life				Benefits & loads D	
		A-C	A1-A3	A4	A5	B1-B7	B1	B2	B6	B3-B5,B7	C1-C4	C1	C2	C3		C4
<b>Mandatory indicators</b>																
Climate change - total (IPCC 2013)	kg CO <sub>2</sub> eq.	2.80E+03	1.78E+02	2.05E+00	2.05E+01	2.55E+03	7.31E+00	2.23E+01	2.52E+03	0.00E+00	5.49E+01	2.01E+01	2.19E-01	3.43E+01	3.78E-01	-3.80E+01
Climate change - fossil fuels	kg CO <sub>2</sub> eq.	2.79E+03	1.71E+02	2.05E+00	1.97E+01	2.54E+03	7.31E+00	2.23E+01	2.51E+03	0.00E+00	5.45E+01	2.01E+01	2.19E-01	3.39E+01	3.62E-01	-3.73E+01
Climate change - biogenics	kg CO <sub>2</sub> eq.	1.05E+01	6.24E+00	0.00E+00	8.43E-01	2.96E+00	0.00E+00	0.00E+00	2.96E+00	0.00E+00	4.23E-01	0.00E+00	0.00E+00	4.07E-01	1.60E-02	-6.76E-01
Climate change - land use and land use transformation	kg CO <sub>2</sub> eq.	5.89E-06	1.00E-07	0.00E+00	1.03E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.69E-06	0.00E+00	0.00E+00	5.69E-06	0.00E+00	0.00E+00
Ozone depletion (WMO 2014)	kg CFC-11 eq.	6.86E-05	4.08E-05	1.82E-06	1.47E-06	2.40E-05	0.00E+00	1.75E-05	6.47E-06	0.00E+00	4.73E-07	0.00E+00	1.94E-07	2.73E-07	7.00E-09	1.56E-05
Acidification (AP)	kg H+ eq.	1.36E+01	1.53E+00	9.26E-03	9.47E-02	1.18E+01	0.00E+00	9.45E-02	1.17E+01	0.00E+00	1.23E-01	0.00E+00	9.87E-04	1.21E-01	9.90E-04	-4.03E-01
Freshwater eutrophication	kg P eq.	1.95E-02	5.00E-04	2.41E-07	8.04E-05	8.66E-03	0.00E+00	2.48E-06	8.66E-03	0.00E+00	1.03E-02	0.00E+00	2.57E-08	1.02E-02	9.36E-05	-7.55E-05
Marine aquatic eutrophication	kg N eq.	1.59E+00	1.72E-01	4.28E-03	8.04E-05	1.40E+00	0.00E+00	3.09E-02	1.37E+00	0.00E+00	2.02E-02	0.00E+00	4.56E-04	1.93E-02	3.62E-04	-2.45E-02
Terrestrial eutrophication	mol N eq.	3.82E+01	1.83E+00	4.64E-02	1.83E-01	3.59E+01	0.00E+00	3.86E-01	3.55E+01	0.00E+00	2.30E-01	0.00E+00	4.94E-03	2.22E-01	2.79E-03	-2.60E-01
Photochemical ozone formation	kg NMVOC eq.	4.58E+00	5.91E-01	1.50E-02	5.48E-02	3.85E+00	0.00E+00	1.59E-01	3.69E+00	0.00E+00	7.51E-02	0.00E+00	1.60E-03	7.27E-02	8.31E-04	-6.40E-02
Abiotic resource depletion - metals and minerals	kg SB eq.	8.39E-03	7.81E-03	1.77E-10	7.79E-07	2.86E-04	0.00E+00	3.86E-09	2.86E-04	0.00E+00	2.94E-04	0.00E+00	1.89E-11	2.94E-04	1.60E-08	-7.11E-03
Abiotic resource depletion - fossils	MJ	8.06E+04	5.26E+03	2.50E+01	2.04E+02	7.34E+04	0.00E+00	2.53E+02	7.31E+04	0.00E+00	1.76E+03	0.00E+00	2.67E+00	1.76E+03	1.81E+00	4.12E+02
Water requirement	m <sup>3</sup>	1.27E+02	6.42E+01	1.05E-01	3.84E+00	4.32E+01	0.00E+00	1.12E+00	4.21E+01	0.00E+00	1.53E+01	0.00E+00	1.11E-02	1.51E+01	1.62E-01	-8.18E+00
<b>Optional indicators</b>																
Emission of fine particles	Disease occurrence	1.21E-04	8.76E-06	2.49E-08	6.94E-07	1.10E-04	0.00E+00	3.64E-07	1.10E-04	0.00E+00	6.34E-07	0.00E+00	2.66E-09	6.26E-07	5.57E-09	-2.44E-06
Ionizing radiation, human health	kg U235 eq.	6.90E+03	1.99E+03	4.57E-03	2.26E+02	4.69E+03	0.00E+00	9.71E-02	4.69E+03	0.00E+00	4.61E-01	0.00E+00	4.87E-04	4.50E-01	1.02E-02	-3.69E+02
Ecotoxicity (freshwater)	CTUe	2.91E+04	1.45E+04	8.43E+00	5.91E+02	1.24E+04	3.19E-04	8.49E+01	1.24E+04	0.00E+00	1.51E+03	8.76E-04	8.99E-01	1.46E+03	4.93E+01	-9.81E+02
Human toxicity, carcinogenic effects	CTUh	5.88E-05	5.72E-05	2.35E-11	1.36E-06	2.12E-07	0.00E+00	1.99E-09	2.10E-07	0.00E+00	1.74E-08	0.00E+00	2.50E-12	1.70E-08	3.80E-10	-2.88E-05
Human toxicity, non-carcinogenic effects	CTUh	1.80E-05	9.89E-06	5.21E-09	1.06E-07	6.68E-06	7.53E-12	8.19E-07	5.86E-06	0.00E+00	1.32E-06	2.07E-11	5.56E-10	1.31E-06	8.17E-09	-8.07E-06
Impacts related to land use/soil quality	-	1.33E+02	3.24E-01	0.00E+00	1.41E+00	1.06E+02	0.00E+00	0.00E+00	1.06E+02	0.00E+00	2.53E+01	0.00E+00	0.00E+00	2.53E+01	0.00E+00	-4.10E-02

A1-A3 Manufacturing; A4 Distribution; A5 Installation; B1 Use; B2 Maintenance; B3 Repair; B4 Replacement; B5 Restoration; B6 Energy requirements; B7 Water requirements; C1 Deinstallation; C2 Transport; C3 Recovery and/or recycling; C4 Disposal; D Benefits & loads beyond the system boundaries

## Environmental impacts per kW, corresponding to the functional unit

The PEP was drawn up under the assumption 1 kW of heating 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 capacity of 5.7 kW.

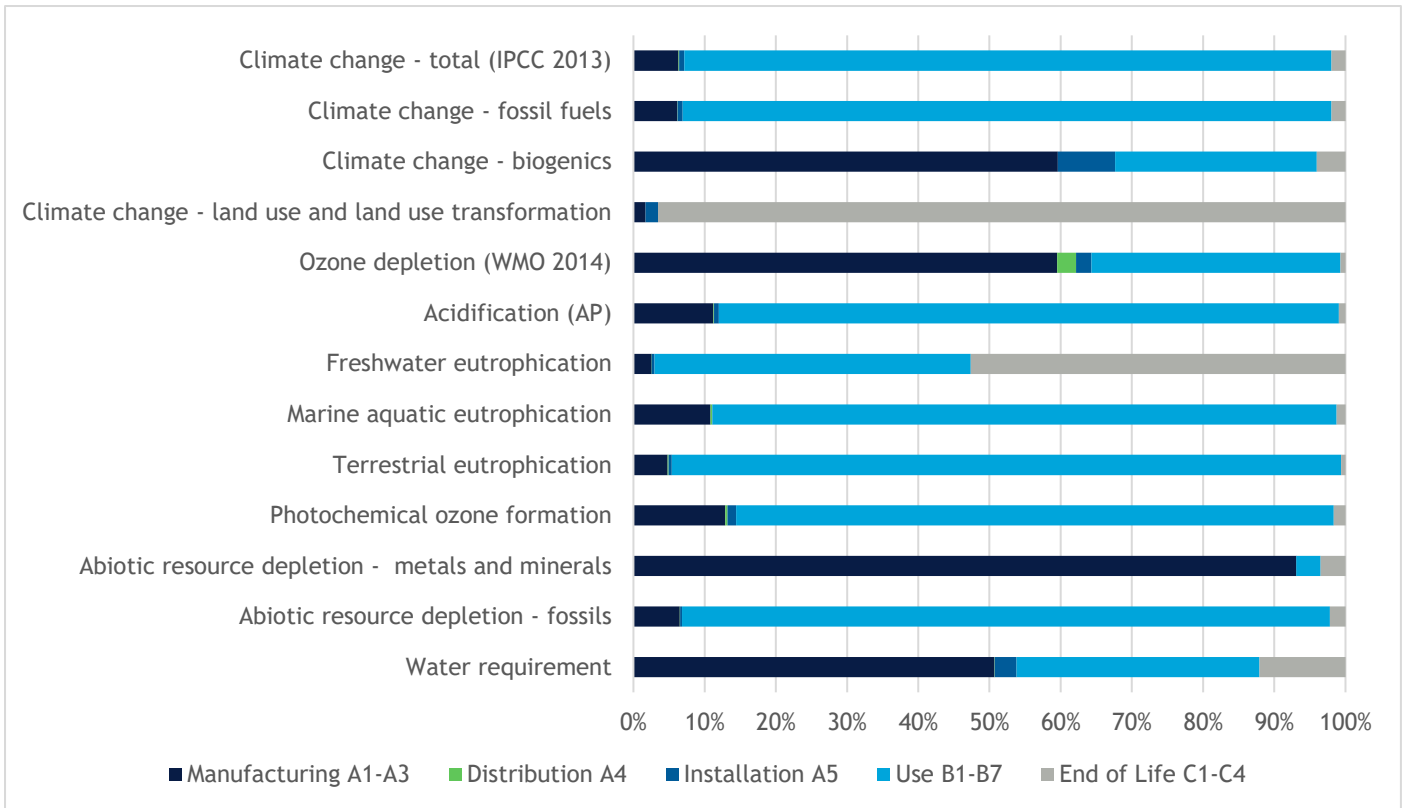
Inventory flow indicators	Unit	Total A-C	Manuf. A1-A3	Distrib. A4	Install A5	Use					End of life				Benefits & loads D	
						B1-B7	B1	B2	B6	B3-B5,B7	C1-C4	C1	C2	C3		C4
<b>Resource use indicators</b>																
Total use of primary energy during the life cycle	MJ	1.03E+05	5.39E+03	2.50E+01	2.24E+02	9.57E+04	0.00E+00	2.53E+02	9.54E+04	0.00E+00	1.77E+03	0.00E+00	2.67E+00	1.76E+03	1.90E+00	3.75E+02
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	2.24E+04	3.46E+01	1.68E-04	1.72E+01	2.23E+04	0.00E+00	3.58E-03	2.23E+04	0.00E+00	6.62E+00	0.00E+00	1.79E-05	6.53E+00	9.16E-02	3.33E+00
Use of renewable primary energy resources used as raw materials	MJ	1.01E+02	9.88E+01	0.00E+00	2.48E+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	-4.11E+01
Total use of renewable primary energy resources	MJ	2.25E+04	1.33E+02	1.68E-04	1.97E+01	2.23E+04	0.00E+00	3.58E-03	2.23E+04	0.00E+00	6.62E+00	0.00E+00	1.79E-05	6.53E+00	9.16E-02	-3.77E+01
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	8.05E+04	5.18E+03	2.50E+01	2.04E+02	7.34E+04	0.00E+00	2.53E+02	7.31E+04	0.00E+00	1.76E+03	0.00E+00	2.67E+00	1.76E+03	1.81E+00	2.92E+02
Use of non-renewable primary energy resources used as raw materials	MJ	7.77E+01	7.76E+01	0.00E+00	1.07E-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	0.00E+00	1.21E+02
Total use of non-renewable primary energy resources	MJ	8.06E+04	5.26E+03	2.50E+01	2.04E+02	7.34E+04	0.00E+00	2.53E+02	7.31E+04	0.00E+00	1.76E+03	0.00E+00	2.67E+00	1.76E+03	1.81E+00	4.12E+02
<b>Use of secondary materials, water and energy resources</b>																
Use of secondary materials	kg	4.14E-04	4.14E-04	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
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	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of freshwater	m <sup>3</sup>	2.68E+00	1.22E+00	2.43E-03	5.42E-02	1.03E+00	0.00E+00	2.60E-02	1.00E+00	0.00E+00	3.83E-01	0.00E+00	2.59E-04	3.82E-01	2.80E-05	-9.87E-02
<b>Waste category indicators</b>																
Hazardous waste disposed	kg	4.05E+02	3.74E+02	1.71E-03	4.75E-01	3.02E+01	0.00E+00	3.04E-02	3.02E+01	0.00E+00	4.97E-01	0.00E+00	1.82E-04	6.97E-02	4.27E-01	-1.90E+02
Non hazardous waste disposed	kg	3.47E+02	1.32E+02	2.10E-03	3.77E+01	1.67E+02	0.00E+00	4.03E-02	1.67E+02	0.00E+00	1.04E+01	0.00E+00	2.24E-04	3.65E+00	6.80E+00	-4.93E+01
Radioactive waste disposed	kg	8.62E-02	3.75E-02	4.10E-04	1.57E-02	3.18E-02	0.00E+00	4.00E-03	2.78E-02	0.00E+00	8.02E-04	0.00E+00	4.37E-05	6.53E-04	1.06E-04	-1.19E-02
<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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	1.34E+01	4.29E-02	0.00E+00	2.32E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.11E+01	0.00E+00	0.00E+00	1.11E+01	0.00E+00	0.00E+00
Materials for energy recovery	kg	3.82E+00	3.09E-01	0.00E+00	9.49E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.56E+00	0.00E+00	0.00E+00	2.56E+00	0.00E+00	0.00E+00
Exported Energy	MJ	1.14E+00	2.24E-01	0.00E+00	8.60E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.16E-02	0.00E+00	0.00E+00	0.00E+00	5.16E-02	0.00E+00

A1-A3 Manufacturing; A4 Distribution; A5 Installation; B1 Use; B2 Maintenance; B3 Repair; B4 Replacement; B5 Restoration; B6 Energy requirements; B7 Water requirements; C1 Deinstallation; C2 Transport; C3 Recovery and/or recycling; C4 Disposal; D Benefits & loads beyond the system boundaries

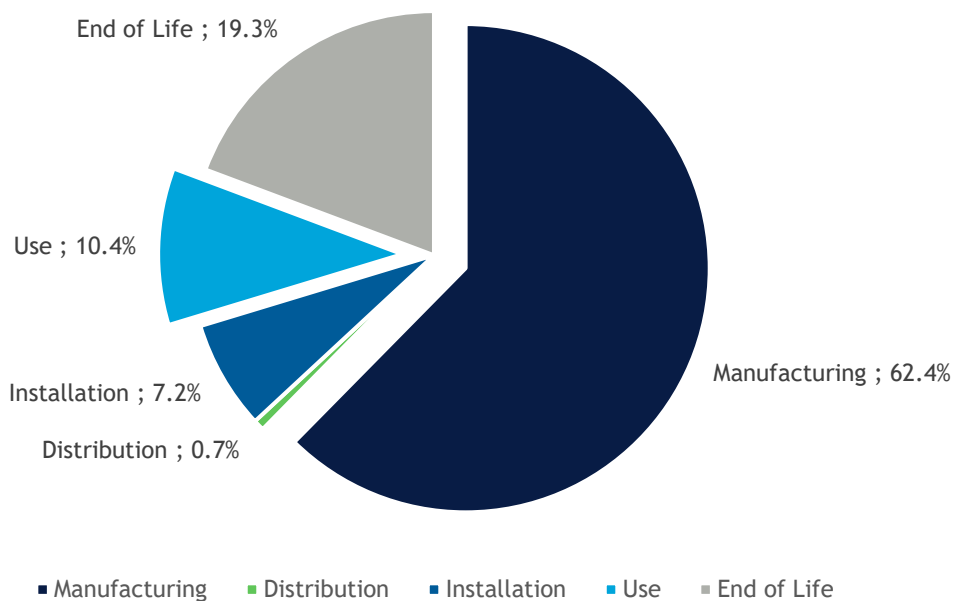
### Biogenic carbon content (assessment methodology 0/0)

- Biogenic carbon content of the product: 0.00E+00 kg C
- Biogenic carbon content of the associated packaging: 1.45E+00 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 C1	$\frac{\text{Mass of frigorific of the product considered (kg)}}{\text{Mass of frigorific of the reference product (kg)}}$
End of life C2-C4	$\frac{\text{Mass of the product considered (kg)}}{\text{Mass of the reference product (kg)}}$
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.

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

For an air/water heat pump in heating only, the power of the product corresponds to “Pratedh”, expressed in kW (regulation n° 813/2013), according to EN 14825 - outdoor air temperature +7°C - water temperature 47/55°

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

Heat pump designation	Reference	Weight <sup>(1)</sup> (kg)		Heat load <sup>(2)</sup> (kW)	Total electricity consumption (kWh)
		Product	Packaging		
HP40-4-1 PHMB	7830576	95.1	25.4	4.40	44892
HP50-4-1 PHMB	7830577				
HP40-5-1 PHMB	7830575	95.1	25.4	5.70	54686
HP50-5-1 PHMB	7830578				
HP40-7-1 PHMB	7830574	114.9	25.6	6.60	66336
HP50-7-1 PHMB	7830579				
HP40-8-1 PHMB	7830573	114.9	25.6	7.67	74219
HP50-8-1 PHMB	7830580				
HP40-11-1 PHMB	7830572	138.4	25.6	11.58	113354
HP50-11-1 PHMB	7830581				
HP40-13-1 PHMB	7830571	138.4	25.6	13.02	128944
HP50-13-1 PHMB	7860582				
HP40-11-3 PHMB	7830570	155.4	25.6	11.58	113354
HP50-11-3 PHMB	7830583				
HP40-13-3 PHMB	7830568	155.4	25.6	13.02	128944
HP50-13-3 PHMB	7830584				

(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) Heat load according to regulation n° 813/2013 - Outside air temperature +7°C - water temperature 47/55°C

## 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.

HP40/50 x-x PHMB	4-1	5-1	7-1	8-1	11-1	13-1	13-3	16-3
Manufacturing	1.000	1.000	1.166	1.166	1.361	1.361	1.502	1.502
Distribution	1.000	1.000	1.166	1.166	1.361	1.361	1.502	1.502
Installation	1.000	1.000	1.008	1.008	1.008	1.008	1.008	1.008
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	0.821	1.000	1.213	1.357	2.073	2.358	2.073	2.358
End of life C1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
End of life C2-C4	1.000	1.000	1.208	1.208	1.455	1.455	1.634	1.634
Benefits and loads	1.000	1.000	1.166	1.166	1.361	1.361	1.502	1.502

## Further information

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