

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration	DAB Pumps SpA
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-DAB-20260549-IBC1-EN
Issue date	27.08.2026
Valid to	26.08.2031

EVOSTA 2 DAB Pumps SpA

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1. General Information

DAB Pumps SpA

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-DAB-20260549-IBC1-EN

This declaration is based on the product category rules:

Pumps for liquids and liquids with solids, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

27.08.2026

Valid to

26.08.2031



Dipl.-Ing. Hans Peters
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(Managing Director Institut Bauen und Umwelt e.V.)

EVOSTA 2

Owner of the declaration

DAB Pumps SpA
Via Marco Polo 14
35035 Mestrino
Italy

Declared product / declared unit

1 Piece of DAB-EVOSTA 2

Scope:

The declared product is one piece of the circulator DAB-EVOSTA 2. The product is manufactured in Mestrino (PD), Italy, and the life cycle assessment is based on the collected data at the production site. The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences. This is a representative EPD focused on the EVOSTA 2 40-70/180 (1") model.

The EPD follows additional requirements applicable to construction products considered as Electrical and Electronic Equipment (EEE).

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidence.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard is abbreviated as *EN 15804*.

Verification

The standard EN 15804 serves as the core PCR			
Independent verification of the declaration and data according to ISO 14025:2011			
☐	internal	☒	external



Mrs Kim Allbury,
(Independent verifier)

2. Product

2.1 Product description/Product definition

The EVOSTA 2 is a wet rotor electronic circulator, with a screwed connection, permanent magnet synchronous electric motor and a frequency drive (for automatic power adjustment and self-protecting modes).

The circulator is specifically designed for water circulation in domestic HVAC systems (Heating, Air conditioning, Cooling).

The EPD is a representative EPD as it focuses on the top-selling variant of the product range EVOSTA 2 (EVOSTA 2 40-70/180).

This declaration also covers:

- Evosta 2 40-70/180 (1"1/4)
- Evosta 2 40-70/130 (1/2")
- Evosta 2 40-70/130 (1")

All variants share the same motor size and electronic control unit. The differences between configurations are limited to the hydraulic components, specifically the pump housing, which varies in geometry and mass according to the nominal diameter and hydraulic performance requirements. All electrical, electronic, and control components remain identical across the entire product family.

The pumps have been treated as belonging to a single product declaration, as the variants are identical or highly similar in terms of functional design, motor assembly, electronic content, manufacturing processes, and supply chain. In addition, packaging specifications, distribution scenarios, reference service life, and end-of-life treatment assumptions are the same for all configurations.

Legal Provisions

For the placing on the market in the European Union/European Free Trade Association (EU/EFTA), except for Switzerland, the following legal provisions apply:

Electromagnetic Compatibility Directive (2014/30/EU)

Low Voltage Directive (2014/35/EU)

Energy-Related Products Directive (2009/125/EC)

Regulation (EC) N° 641/2009 and Regulation (EU) N° 622/2012

Restriction of the use of certain hazardous substances 2011/65/EU + 2015/863

The CE-marking takes into account the proof of conformity with the respective harmonized standards based on the legal provisions above.

EVOSTA 2 pumps are not harmonized in accordance with the Construction Product Regulation.

Harmonized standards:

- Household and similar electrical appliances - Safety - Part 1: General requirements (EN 60335-1:2012/A13:2017)
- Household and similar electrical appliances - Safety - Part 2-51: Particular requirements for stationary circulation pumps for heating and service water installations (EN 60335-2-51)
- Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure (EN 62233:2008)
- Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission (EN 55014-1:2017)
- Electromagnetic compatibility. Requirements for household

appliances, electric tools and similar apparatus - Immunity.

Product family standard (EN 55014-2:2015)

- Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase) (EN 61000-3-2:2014)

- Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection (EN 61000-3-3:2013)

- Pumps. Rotodynamic pumps. Glandless circulators. - General requirements and procedures for testing and calculation of energy efficiency index (EEI) (EN 16297-1:2012)

- Pumps. Rotodynamic pumps. Glandless circulators - Calculation of energy efficiency index (EEI) for standalone circulators (EN 16297-2:2012)

- Pumps - Rotodynamic pumps - Glandless circulators - Part 3: Energy efficiency index (EEI) for circulators integrated in products (EN 16297-3:2012)

2.2 Application

The pump is designed for circulating water in the following systems:

- Heating
- Cooling and air conditioning
- Domestic Hot Water

2.3 Technical data

The relevant technical specifications according to the PCR Part B is given in the table below.

Constructional data

Name	Value	Unit
Frequency	50 - 60	Hz
Voltage	1~230	V
Energy efficiency	≤ 0.18	-
Flow range (max)	3.6	m³/h
Head max.	6.9	m
Max Input Power	0.035	kW
Power input Average (from load profile describing use)	0.01995	kW
Pumped liquid	Water	-

The performance data of the product according to the harmonized norms, based on the harmonized provisions above apply.

2.4 Delivery status

The scope of placement of the market of the circulator includes the following items:

- Circulator
- Installation and operating instructions

The dimensions of EVOSTA 2 40-70/180 (1") are:

Length 180 mm; Width 144.1 mm and Height 91 mm.

2.5 Base materials/auxiliary materials

To provide a specific overview of the distribution of materials within the circulator, the following table shows the percentage composition considering various material classes. This overview does not include packaging, but it is considered in the life-cycle assessment.

Name	Value	Unit
Cast iron	66.2	%
Carbon steel	4.1	%
Stainless steel	8.1	%
Copper	8.4	%
Brass	1.6	%
Ceramics	1.1	%
Synthetic rubber	0.4	%
Polymers and composites	8.0	%
Magnet	1.4	%
Electronics	0.7	%

Ceramics class includes alumina and graphite components; composites include plastic matrix glass fibers reinforced materials.

This product contains substances listed in the *candidate list* (date 04.02.2026) exceeding 0,1 percentage by mass: yes
Lead:

CAS 7439-92-1

Concentration range: > 0,1% w/w and ≤ 100% w/w

This product contains other carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on the candidate list, exceeding 0,1 percentage by mass: no

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on Biocide Products No. 528/2012): no

2.6 Manufacture

Almost all the material inputs for circulator manufacturing are in the form of components (semi-finished products) from suppliers. Almost all the suppliers are Italian, apart from pump housing and electronic unit containing the printed circuit board (PCB), sourced from outside of the EU. The only component manufactured in-house at DAB is the stainless steel 'rotor can'. DAB essentially carries out the assembly operation required to produce the circulator. This assembly takes place on a dedicated, fully automated production line comprising several stations. The assembly process starts in the stator pack storage area, where upper and lower caps with pins are fitted to stator itself. The stator pack is conveyed to the winding area with six automatic winding machines. Once the winding process is complete, the assembled parts undergo an automatic inspection to ensure meeting the required standards. Any defective parts are treated as scrap and sent to the appropriate waste management area. The assembly then moves onto the impeller area, where impeller hub, with an insert, is ultrasonically welded to the impeller shroud. The next step is to insert rotor into perforated rotor can. Thereafter, pump housing, motor housing, protective trade shell and electronic box (with PCB) are assembled to create the finished circulator. Finally, an electrical acceptance test is carried out with subsequent packed products ready for dispatch to customers.

2.7 Environment and health during manufacturing

DAB-HSE-Management ensures the implementation of standards and tools to avoid personal-, property-, environmental damages and financial losses as well as reducing liability risks by applying preventive actions. Main Elements:

- Risk management
- Definition and implementation of protection rules
- Management of chemical products
- Emergency Management
- Ensure safe operation of technical equipment

- Analysis of nonconformities and action follow-up
- The production site is ISO 14001 and ISO 45001 certified.

2.8 Product processing/Installation

EVOSTA 2 circulator forms part of a complex system equipment within domestic and residential settings. Installation within the building is usually carried out by other companies; therefore, DAB has no direct influence on how the product is installed.

2.9 Packaging

The finished product is packed in a cardboard box with various adhesive labels and an instruction booklet inside. This box is then transported on pallets to customers, with a quantity of 240 circulators per pallet.

Packaging components are marked for appropriate waste sorting and can be recycled through established recycling systems. Reuse is possible when the packaging is undamaged. Where recycling is not available, energy recovery may be considered, while landfill disposal should be minimized.

2.10 Condition of use

The circulator is maintenance-free.

2.11 Environment and health during use

In the operating phase, the circulator does not emit any pollutants that are hazardous to the environment or health.

2.12 Reference service life

No usage level scenario is given that relates to the life of the product.

According to Appendix 6: EUP Lot 11, Circulators in buildings, a RSL of 10 years can be used to facilitate calculations. [CC1]

[CC1] Appendix 6: EUP Lot 11, Circulators in buildings AEA Energy & Environment for the European Commission, April 2008. Based on the DIRECTIVE 2009/125/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 October 2009.

The RSL of the declared product does not directly affect the results of this study because no scenario of the declared use level depends in the RSL; the B6 module of the operational use phase is declared per one year according to PCR Part B.

2.13 Extraordinary effects

Fire

Not applicable because the product is not harmonized under CPR.

Water

Not applicable

Mechanical destruction

Not applicable

2.14 Re-use phase

The following possibilities arise in terms of material composition:

Material recycling

The materials suitable for material recycling largely comprise metallic materials in the product.

Incineration

The materials suitable for incineration primarily comprise the plastics and glass-fibres reinforced plastic components, as well as copper and brass (copper alloy).

Landfilling

It is assumed that both the ceramic and part of steel fractions will be sent to landfill.

2.15 Disposal

Manufacturing/Assembly

All wastes generated during the manufacturing of the 'rotor can' components and assembling process of the final product are sent to relevant waste treatment facilities for recovery operation.

Waste code in accordance with the *European Waste Catalogue EWC 2001 118 EC*:
EWC 07 02 13 plastic waste

EWC 12 01 01 ferrous metal filings and turnings
EWC 12 01 03 non-ferrous metal filings and turnings
EWC 15 01 02 plastic packaging
EWC 16 02 16 components removed from discarded equipment other than those mentioned in 16 02 15 (wastes from electrical and electronic equipment)

EOI

In the case of dismantled old circulators, some of the materials used in the components (steel, copper and brass) will undergo recycling.
Disposal of the drive unit in Europe is subject to the *Waste from Electrical and Electronic Equipment (WEEE) Directive 2012/19/EU*.

2.16 Further information

www.dabpumps.com

3. LCA: Calculation rules

3.1 Declared unit

The declared unit is 1 piece (pce) of product.

Declared unit

Name	Value	Unit
Declared unit	1	pce.
Mass reference	2.16	kg/pce
Mass circulator reference	2.08	kg/pce
Mass packaging reference	0.08	kg/pce

The table above shows that the total reference mass for a product unit also includes the weight of its packaging.

3.2 System boundary

This EPD is classified as Cradle-to-Grave and module D. All major steps, from the extraction of raw materials to the final disposal of the product are included in the scope of the study, following the modular approach reported in *EN 15804*. The following modules were considered for calculating the LCA:

- A1: Raw material supply (including extraction and processing)
- A2: Transport and delivery of the base material to DAB assembly site (located in Via Marco Polo, 14, 35035, Mestrino, PD, Italy)
- A3: Manufacturing process
- A4: Transporting the circulators to final customers/distributors
- A5: Handling waste from product packaging
- B6: Operational energy use (1 year)
- C2: Transport EoL
- C3: Waste processing for reuse, recycling or energy recovery
- C4: Waste disposal
- D: Reuse, recovery and/or recycling potentials beyond system boundaries

The B1 informative module provides information on environmental emissions from the use of the installed product. No substances are expected to be released into the various environmental compartments during normal use, so potential environmental impacts of this module are equal to zero.

The B2 informative module relates to maintenance activities. Assuming correct installation of the product, the presence of a vent and the fact that the pumped liquid is water means that environmental impacts of maintenance can be considered negligible and therefore set to zero.

The B3, B4 and B5 informative modules, relating to Repair, Replacement and Refurbishment are considered by default as 'Module Not Relevant' (MNR) in accordance with decision no.

20170712-n of the SVR.

The B7 informative module relates to operational water use, and its potential environmental impacts are set to zero, as no water consumption is expected during operational use of the circulator.

The C1 informative module covers deconstruction of the product from the building. As circulators are typically installed in a reversible manner, the removal process involves straightforward manual disassembly, resulting in negligible waste generation; for this reason, module C1 is set to zero.

Product stage (A1-A3):

Includes raw material supply, processing, transport and manufacturing/assembly process according to *EN 15804+A2*. The input of biogenic carbon from the production of packaging materials (cardboard, pallet) is considered in module A3. Italian grid electricity residual mix medium voltage (GWP-total equal to 0,65 kg CO₂-Eq./kWh) is used during manufacturing/assembly at DAB's production site.

Construction process stage (A4-A5):

Module A4 includes transportation of the packaged circulator from the manufacturing site to distributors and/or final customers. Module A5 includes installation of the circulator and end-of-life treatment of packaging materials. Energy consumption during installation is considered negligible and is therefore excluded from the system boundary.

Use stage (B1-B7):

The contribution of operational energy use during the use phase (B6) is derived from the electricity consumption of the product. The RSL of 10 years is based on *Appendix 6: EUP Lot 11, Circulators in building*. For this study, the calculation principle recommended by the *PCR Part B* is used (1 year of operational use). For the Calculation of the energy demand of the circulator, the absorbed power according to *Europump 2024* document is applied. The running hours per year are equal to 3625h, as reported in *Europump 2024* document. The consumption grid mix is used for the electricity demand during the use phase (B6). GWP-total of the European low-voltage consumption grid mix is equal to 0,33 kg CO₂-Eq/kWh.

End-of-Life stage (C1-C4):

At the end-of-life stage, the circulator is manually disassembled from the system in which it has been installed. The definition of the applied end-of-life scenario in this EPD follows the requirements in *PCR Part A*, 6.2 regarding complex products, with a combination of recycling, incineration and landfill of waste. 100 % of the material is considered in the end-of-life

scenario as required in the PCR. Module C3 includes the shredding process and the recycling of part of metallic fractions. For waste incineration of EVOSTA 2 material-specific incineration plants are considered. Based on the specific efficiency of these processes ($R1 < 60\%$). C4 is considered in the calculation. Relevant energy recoveries from the incineration processes of the product beyond system boundaries under consideration are declared in module D.

Beyond system boundaries (module D):

Where relevant, module D declares potential loads and benefits beyond the system boundaries considering secondary material use and energy recovery for circulator materials leaving the product system. Module D recognizes the 'design for reuse, recycling and recovery' concept for buildings by indicating the potential benefits of avoided future use of primary materials while considering loads associated with recycling and recovery processes beyond system boundaries. Following *EN 15804+A2* a net flow analysis is used. The factors per kg of material to evaluate the potential benefit are calculated.

3.3 Estimates and assumptions

Wherever available, primary data was prioritized for all production processes. Generic data was used for the production of materials. Assumptions were made for modules A2, A4, A5, C2, C3 and D.

Circulators' suppliers were provided accurately by DAB (primary data), and it was therefore possible to use tools such as Google Maps and EcoTransIT to calculate distances from DAB plant in Mestrino. In some cases, the supplier was not specified, so a default distance of 100 km was assumed instead.

As DAB provided a percentage of sales for each supplier (along with the relevant city), it was possible to calculate all distances (with Google Maps and EcoTransIT tools). A weighted average could then be calculated to obtain a value in km for the declared unit (1 piece). This calculation was carried out for both lorry and ship freight distribution at national and international levels.

The transport in the packaging EoL stage (A5) is assumed to be 50 km. Eurostat statistics (for the average of 27 countries of the EU) have been used regarding the treatment type to which packaging waste is subjected.

The transport in the circulator EoL stage (C2) is assumed to be 500 km.

A recycling rate for steel of 45 % and for copper and brass of 80 % are assumed. The remaining steel (55 %) will be sent to landfill, while the remaining copper and brass (20 %) will be incinerated. It is hypothesized that ceramic fraction will be sent entirely to landfill, while plastic and composite fractions to incineration.

3.4 Cut-off criteria

In accordance with *PCR Part A* was adopted a cut-off criterion of 1 % in terms of renewable and non-renewable primary energy usage and of total mass input for a unit process. All processes for which data are available have been considered, even those with a contribution of less than 1 %. This cut-off value has consequently been used to avoid collecting unknown data, rather than disregard available data. In accordance with this principle, water consumption for product washing and emissions into air and water of Mestrino plant have been excluded. This is because no specific data are available for the circulator under study; therefore, total water consumption and emissions should be allocated to the total kg produced in the

plant in 2023 (reference year). Given the large quantity of products manufactured, the specific value for the examined product would be below cut-off level.

3.5 Background data

The *SimaPro* software system, developed by PRé Sustainability was used for modelling the product's LCA. The datasets contained therein are from the *Ecoinvent* database (v3.10). The datasets were sourced from the ecoinvent database applying the 'Cut-off by classification' system model.

3.6 Data quality

Primary (or site-specific) data were used wherever possible for processes under DAB's financial and operational control. Secondary data were used only for processes outside DAB's direct control, including raw material extraction and processing, component manufacturing, retail-to-customer transport, electricity production during use, and end-of-life treatment scenarios.

The life cycle model was developed using *SimaPro* software and the *ecoinvent v3.10* database, applying the "Cut-off by classification" system model.

The reference production data were collected for the year 2023. Corresponding datasets were available for the input materials used. The age of the background data used (2014-2023) is less than 10 years and can be regarded as representative for the assessment period.

The European low-voltage electricity consumption mix was used to model operational electricity consumption in module B6.

The quality of the data was assessed according to the methodology provided in the ILCD Handbook and the requirements of *EN 15804:2012+A2:2019*, Annex E, Table E.2 (Data Quality Indicators and Rating Criteria).

For the EPD three data quality indicators were evaluated: Technological Representativeness (TeR), Geographical Representativeness (GR), Temporal Representativeness (TiR). The assessment focused on the life cycle stages with the highest contribution to the overall environmental impacts, namely raw material production (A1) and electricity consumption during use (B6).

For Module A1, the data quality assessment resulted in:

- TeR = Good (2)
- GR = Good (2)
- TiR = Very Good (1)

For Module B6, the data quality assessment resulted in:

- TeR = Very Good (1)
- GR = Good (2)
- TiR = Very Good (1)

No datasets classified as Poor (4) or Very Poor (5) for any of the assessed data quality indicators were identified among the processes contributing significantly to the environmental impacts. Furthermore, no high-contribution datasets with a Fair (3) rating for temporal, geographical or technological representativeness were identified.

3.7 Period under review

2023 was selected as the reference period. All internal data was collected for this period.

3.8 Geographic representativeness

Country or region in which the declared product system is manufactured, used or handled at the end of the product's life

3.9 Allocation

No co-products arise during manufacturing of the circulator, which is why no allocations to the product level were necessary.

For the foreground system modelling of the in-house manufacturing (only electricity) at DAB's production site, a physical-based allocation of the environmental impacts at the production site level was performed. The specific electricity consumption for producing one EVOSTA 2 unit was derived from a production line monitoring performed in 2020. The specific electricity consumption was calculated based on EVOSTA 2 unit manufacturing during that monitoring period.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The biogenic carbon content of the cardboard for packaging is 0,43 kg C/kg cardboard and the biogenic carbon content of the wooden pallet for packaging is 0,57 kg C/kg pallet.

Information on describing the biogenic carbon content at factory gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	0.03	kg C

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

The following technical information forms the basis for the declared gate-to-grave modules and can be used for developing specific scenarios in the context of a building assessment.

Transport from the gate to the site (A4)

Name	Value	Unit
Litres of fuel (lorry)	0.095	l/100km
Weighted average distance by lorry	893	km
Capacity utilisation (including empty runs) (lorry)	50	%
Litres of fuel (ship)	0.000548	l/100km
Weighted average distance by ship	0.26	km
Capacity utilisation (including empty runs) (ship)	70	%

Assembly (A5)

Name	Value	Unit
Transport from installation site to waste treatment site	50	km
Packaging waste for recycling (paper & cardboard)	0.024	kg
Packaging waste for incineration (paper & cardboard)	0.0021	kg
Packaging waste for landfill (paper & cardboard)	0.0015	kg
Packaging waste for recycling (wood)	0.0147	kg
Packaging waste for incineration (wood)	0.0118	kg
Packaging waste for landfill (wood)	0.0125	kg
Packaging waste for recycling (plastic)	0.007	kg
Packaging waste for incineration (plastic)	0.006	kg
Packaging waste for landfill (plastic)	0.0038	kg

The allocation procedures for the background data are described in the documentation of the datasets used. The allocation is done either by physical (weight/energy) or economic values.

Materials that are recycled are considered as an input for the next product system boundary.

3.10 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all data sets to be compared were created according to EN 15804 and the building context and product-specific performance characteristics are taken into account. All background data was taken from the *Ecoinvent* database (v3.10).

A RSL of 10 years can be used for building calculations according to Appendix 6: EUP Lot 11, Circulators in buildings.

Reference service life

Name	Value	Unit
Life span according to the manufacturer	10	year

Operational energy use (B6)

Name	Value	Unit
Electricity consumption	72.32	kWh

End of life (C1-C4)

Name	Value	Unit
Collected as mixed construction waste	2.08	kg
Shredding weight	2.08	kg
Transport distance	500	km
Recycling	0.9	kg
Incineration	0.22	kg
Landfilling	0.95	kg
Circuit board specific treatment	0.01	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Module D includes energy recovery (with an efficiency lower than 60 %) from plastics incineration processes and considering only thermal energy (heat) as exported. Module D also includes material credits for recycling (export of secondary materials to replace virgin materials).

Name	Value	Unit
Plastic for incineration with energy recovery (efficiency lower than 60%)	0.1672	kg
Plastic (from packaging) for recycling (net amount)	0.007	kg
Cast iron (from product) for recycling (net amount)	0.6183	kg
Steel (from product) for recycling (net amount)	0.03825	kg
Stainless steel (from product) for recycling (net amount)	0.07425	kg
Copper (from product) for recycling (net amount)	0.14	kg
Brass (from product) for recycling (net amount)	0.02584	kg

5. LCA: Results

Characterization model: *EN 15804 - 2012+A2 - 2019* (based on EF 3.1 (IPCC AR6)). By Decision no. 20170712-n of the IBU SVR, the modules B3, B4, B5 are marked as MNR (module not relevant) as default. The LCA results in module B6 are given over a period of one year, according to *PCR Part B*. To obtain the results from module B6 over the entire life cycle, the LCA results of module B6 must be multiplied by the estimated RSL of 10 years.

For manufacturing (A3) the Italian grid electricity residual mix medium voltage (GWP-total equal to 0,65 kg CO₂-Eq./kWh) is used.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	MNR	MNR	MNR	X	X	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece (pc of product)

Parameter	Unit	A1-A3	A4	A5	B1	B2	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq	1.41E+01	3.67E-01	4E-02	0	0	2.46E+01	0	0	1.59E-01	1.07E-01	5.46E-01	-2.03E+00
GWP-fossil	kg CO ₂ eq	1.37E+01	3.66E-01	1.57E-02	0	0	2.37E+01	0	0	1.59E-01	1.07E-01	5.46E-01	-2.06E+00
GWP-biogenic	kg CO ₂ eq	3.66E-01	2.54E-04	2.43E-02	0	0	8.38E-01	0	0	9.63E-05	-3.75E-04	2.95E-05	2.99E-02
GWP-luluc	kg CO ₂ eq	9.92E-03	1.22E-04	5.09E-07	0	0	7.21E-02	0	0	5.38E-05	1.43E-04	6.49E-06	-9.23E-04
ODP	kg CFC11 eq	1.43E-07	7.28E-09	2.65E-11	0	0	4.37E-07	0	0	3.19E-09	7.25E-10	3.54E-10	-1.42E-08
AP	mol H ⁺ eq	1.29E-01	7.63E-04	1.03E-05	0	0	1.39E-01	0	0	7.13E-04	5.85E-04	1.87E-04	-1.58E-02
EP-freshwater	kg P eq	2.79E-02	2.48E-05	2.97E-07	0	0	2.2E-02	0	0	1.09E-05	4.9E-05	7.61E-06	-1.94E-02
EP-marine	kg N eq	2.35E-02	1.83E-04	1.91E-05	0	0	2.18E-02	0	0	2.8E-04	1.08E-04	1.08E-04	-8.31E-03
EP-terrestrial	mol N eq	2.84E-01	1.98E-03	4.68E-05	0	0	1.96E-01	0	0	3.05E-03	1.17E-03	9.11E-04	-1.18E-01
POCP	kg NMVOC eq	7.61E-02	1.27E-03	1.47E-05	0	0	6.45E-02	0	0	1.1E-03	3.29E-04	2.47E-04	-2.39E-02
ADPE	kg Sb eq	1.06E-03	1.19E-06	3.62E-09	0	0	3.18E-04	0	0	4.93E-07	9.67E-07	3.28E-08	-1.64E-04
ADPF	MJ	1.67E+02	5.15E+00	1.87E-02	0	0	5.51E+02	0	0	2.27E+00	1.36E+00	2.71E-01	-2.15E+01
WDP	m ³ world eq deprived	4.11E+00	2.14E-02	-2.2E-03	0	0	6.83E+00	0	0	9.92E-03	1.79E-02	8.28E-03	-1.21E-01

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece (pc of product)

Parameter	Unit	A1-A3	A4	A5	B1	B2	B6	B7	C1	C2	C3	C4	D
PERE	MJ	1.93E+01	8.87E-02	4.16E-04	0	0	1.51E+02	0	0	3.93E-02	1.8E-01	4.93E-03	-5.19E+00
PERM	MJ	1.13E+00	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	2.04E+01	8.87E-02	4.16E-04	0	0	1.51E+02	0	0	3.93E-02	1.8E-01	4.93E-03	-5.19E+00
PENRE	MJ	1.74E+02	5.48E+00	2E-02	0	0	5.74E+02	0	0	2.41E+00	1.45E+00	2.92E-01	-2.31E+01
PENRM	MJ	4.7E+00	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	1.79E+02	5.48E+00	2E-02	0	0	5.74E+02	0	0	2.41E+00	1.45E+00	2.92E-01	-2.31E+01
SM	kg	0	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0
FW	m ³	1.21E-01	7.13E-04	-4.39E-05	0	0	4.76E-01	0	0	3.28E-04	6.75E-04	2.98E-04	-9.29E-03

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece (pc of product)

Parameter	Unit	A1-A3	A4	A5	B1	B2	B6	B7	C1	C2	C3	C4	D
HWD	kg	2.3E-02	1.29E-04	2.42E-04	0	0	3.11E-02	0	0	5.91E-05	9.39E-05	4.47E-02	-7.67E-04
NHWD	kg	1.1E+00	2.49E-01	1.88E-02	0	0	1.77E+00	0	0	1.4E-01	8.33E-03	9.53E-01	-2.16E-01

RWD	kg	1.8E-04	1.66E-06	6.48E-09	0	0	3.91E-03	0	0	7.46E-07	3.37E-06	7.2E-08	-2.11E-07
CRU	kg	0	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	2.53E+00	0	4.61E-02	0	0	0	0	0	0	8.98E-01	0	0
MER	kg	0	0	1.99E-02	0	0	0	0	0	0	0	2.15E-01	0
EEE	MJ	0	0	0	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0	0	0	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:

1 piece (pc of product)

Parameter	Unit	A1-A3	A4	A5	B1	B2	B6	B7	C1	C2	C3	C4	D
PM	Disease incidence	1.31E-06	2.7E-08	1.39E-10	0	0	4.97E-07	0	0	1.54E-08	5.34E-09	1.73E-09	-2.67E-07
IR	kBq U235 eq	7.24E-01	6.68E-03	2.6E-05	0	0	1.52E+01	0	0	3E-03	1.38E-02	2.92E-04	-4.61E-03
ETP-fw	CTUe	1.06E+03	2.8E+00	2.35E-01	0	0	1.97E+02	0	0	1.18E+00	8.44E-01	1.27E+01	-6.44E+02
HTP-c	CTUh	5.13E-07	2.6E-09	1.29E-11	0	0	5.56E-08	0	0	1.07E-09	2.57E-10	1.84E-10	-3.71E-07
HTP-nc	CTUh	1.18E-06	3.23E-09	9.98E-11	0	0	3.85E-07	0	0	1.58E-09	3.2E-09	1.43E-08	-1.61E-07
SQP	SQP	9.12E+01	3.11E+00	1.87E-02	0	0	1.23E+02	0	0	1.7E+00	4.21E-01	3.45E-01	-1.81E+01

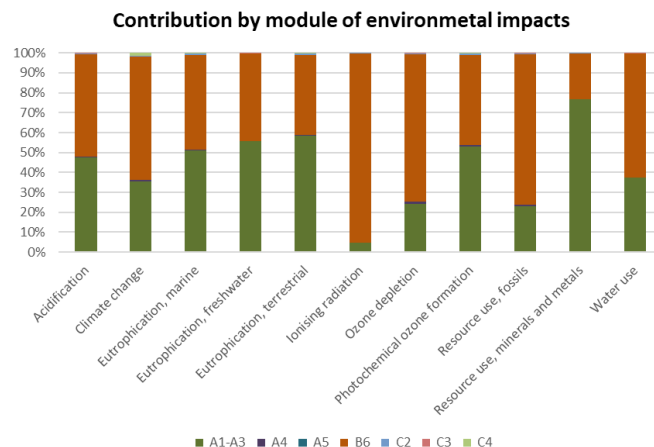
PM = Potential incidence of disease due to PM emissions; IR = Potential human exposure efficiency relative to U235; ETP-fw = Potential comparative toxic unit for ecosystems; HTP-c = Potential comparative toxic unit for humans (carcinogenic); HTP-nc = Potential comparative toxic unit for humans (not carcinogenic); SQP = Potential soil quality index

Disclaimer 1 – for the indicator “Potential human exposure efficiency relative to U235”. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – carcinogenic”, “Potential comparative toxic unit for humans - not carcinogenic”, “potential soil quality index”. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

6. LCA: Interpretation

The raw materials' sourcing and operational energy use are major contributors to environmental impacts in all categories. The transportation processes, distribution of finished product, as well as disposal of packaging and of the circulator at the end of their life, have a negligible impact on all categories.



7. Requisite evidence

Requisite evidence is not required by the specific *PCR Part B*.

8. References

Standards

EN 15804

UNI EN15804:2012-04+A2:2019+AC:2021, Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.

ISO 9001

UNI EN ISO 9001:2015, Quality management systems – Requirements.

ISO 14001

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ISO 14021

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ISO 14025

UNI EN ISO 14025:2011-10, Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

ISO 45001

UNI EN ISO 45001:2023+A1:2024, Occupational health and safety management systems - Requirements with guidance for use.

EN 60335

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EN 60335-2-51, Household and similar electrical appliances - Safety - Part 2-51: Particular requirements for stationary circulation pumps for heating and service water installations.

EN 62233

EN 62233:2008, Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure.

EN 55014

EN 55014-1:2017, Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission.

EN 55014-2:2015, Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 2: Immunity - Product family standard.

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EN 16297

EN 16297-1:2012, Pumps. Rotodynamic pumps. Glandless circulators. - General requirements and procedures for testing and calculation of energy efficiency index (EEI).

EN 16297-2:2012, Pumps. Rotodynamic pumps. Glandless circulators - Calculation of energy efficiency index (EEI) for standalone circulators.

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Further Literature**Appendix 6: EUP Lot 11, Circulators in buildings**

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Europump 2024

Use phase GHG emissions from pump units, The Voice of the European Pump Industry, February 2024.

Candidate List/REACH

Candidate List of Substances of Very High Concern for Authorisation, ECHA, 2019.

Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation Authorisation and Restriction of Chemicals (REACH).

CPR Regulation

Regulation (EU) No 305/2011 of the European Parliament and of the Council of March 2011, laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC.

Ecodesign Directive/Energy-Related Products Directive

DIRECTIVE 2009/125/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products.

Electromagnetic Compatibility Directive

DIRECTIVE 2014/30/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26th February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.

European Waste Catalogue

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Restriction of the use of certain hazardous substances in electrical and electronic equipment

DIRECTIVE 2011/65/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

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Specific literature**IBU 2021**

Institut Bauen und Umwelt e.V.: General Guidance for the EPD program of the Institut Bauen und Umwelt e.V. (IBU). Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021. www.ibuepd.com

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PCR Part B: Pumps for liquids and liquids with solids

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MAKING WATER EASY

The literature referred to in the Environmental Product Declaration must be listed in full. Standards already fully quoted in the EPD do not need to be listed here again.

The current version of PCR Part A and PCR Part B of the PCR document on which they are based must be referenced.



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