

ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH ISO 21930 AND ISO 14025:2006

SmartEPD-2026-116-1007-01

SCALA2 3-45 115V 60HZ NEMA 5-15 plug (US version)



Date of Issue:	Expiration:	Last updated:
Aug 06, 2026	Aug 06, 2031	Aug 23, 2026

Refer to the EPD Library at www.smartepd.com for the latest EPD listing information



General Information

Grundfos Holding A/S

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Product Name:	SCALA2 3-45 115V 60HZ NEMA 5-15 plug (US version)
Declared Unit:	1 piece
Declaration Number:	SmartEPD-2026-116-1007-01
Date of Issue:	August 06, 2026
Expiration:	August 06, 2031
Last updated:	August 23, 2026
EPD Scope:	Cradle to grave A1 – A3, A4, A5, B1 – B7, C1 – C4, D
Market(s) of Applicability:	North America

General Organization Information

Grundfos is a global, independent (foundation-owned) water technology company, operating in four divisions, established in 1945. Its headquarter is located in Bjerringbro, Denmark, and have solid presence in 60+ countries with 20,000+ employees.

We are committed to pioneering solutions to the world's water and climate challenges and improving the quality of life for people. With an annual production of more than 15 million pump units, we are one of the world's leading pump manufacturers and in this capacity, we set the business standard in terms of innovation, efficiency, reliability and sustainability.

Further information can be found at: <https://www.grundfos.com/content/dam/global/page-assets/about-us/media/press-materials/documents/Grundfos-facts-sheet.pdf>

Limitations, Liability and Ownership

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the whole building life cycle. EPD comparability is only possible when all stages of a life cycle have been considered. However, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared. The EPD owner has sole ownership, liability, and responsibility for the EPD.

EPDs are comparable only if they comply with ISO 21930:2017, use the same sub-category PCR where applicable. include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works.

Reference Standards

Standard(s): ISO 21930 and ISO 14025:2006

Core PCR:	IBU PCR for Building-Related Products and Services Part A v1.4 Date of issue: April 15, 2024
Sub-category PCR:	IBU Part B: Requirements on the EPD for Preinsulated Pipes for District Heating and Cooling v.12 Date of issue: July 24, 2023 Valid until: July 24, 2028
Sub-category PCR review panel:	 Contact Smart EPD for more information.
General Program Instructions:	 Smart EPD General Program Instructions v.2.0, March 2025

Verification Information

LCA Author/Creator:	 Grundfos LCA&EPD Department  Grundfos Holding A/S  LCA_EPD@grundfos.com
EPD Program Operator:	 Smart EPD  info@smartepd.com  www.smartepd.com  585 Grove St., Ste. 145, Herndon, VA 20170, USA
Verification:	Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071:  Kim Allbury   kim.allbury@ricardo.com Independent external verification of EPD, according to ISO 14025 and reference PCR(s):  Kim Allbury   kim.allbury@ricardo.com

External

External

Product Information

Declared Unit:	1 piece
Mass:	12.29 kg
Reference Service Life:	10 Years
Product Specificity:	 Product Average  Product Specific

Product Description

Grundfos SCALA2 pumps are all-in-one integrated pressure boosters designed for domestic use and ensure a constant supply of clean water to households, gardens and light commercial applications. Grundfos SCALA2 is a fully integrated, high-efficiency, self-priming pressure booster.

SCALA2 incorporates integrated speed control, enabling constant water pressure at the taps. The electronically controlled inverter limits the starting and operating currents, providing soft starts and high energy savings. The water-cooled motor and pump design offer a very low noise level down to 44 dB(A) in

typical usage. SCALA2 is equipped with an integrated sensor that measures the pressure discharged from the pump. The sensor sends a signal to the pump control and compares the measured pressure level with the desired pressure level, which is the pressure set according to the homeowner's needs.

SCALA2 pumps are recommended for the following applications:

- pressure boosting of city mains water
- pressure boosting of water from roof tank
- pressure boosting of water from break tank
- pressure boosting of water from ground tank
- water supply from shallow wells [8 m (26.2 ft)]
- garden irrigation
- water transfer.

These pumps are designed to provide reliable, efficient, and sustainable solutions for various heating and cooling applications, ensuring optimal performance and reduced energy consumption through its permanent magnet motor and variable speed drive (VSD).

Further information can be found at: <https://product-selection.grundfos.com/products/scala/scala2/scala2-3-45-93013251?frequency=60&pumpsystemid=2919007712&tab=documentation>

Product Specifications

Product SKU(s):

The declared unit is one piece (pce.) of a SCALA2 3-45 115V 60HZ NEMA 5-15 plug pump variant for the US market. PN number: 93013251.

Pump technical data for SCALA2 3-45 115V 60HZ NEMA 5-15 plug

Frequency: 60 Hz

Voltage: 1 x 115 V

Pumped liquid: Clean water

Head max.: 45 m

Flow range (max): 4.6 m³/h

Max input power: 0.550 kW

Power input average from load profile: 0.232 kW

Nominal capacity: 0.450 kW

Energy Efficiency Index (EEI): ≤ 0.23

Product Classification Codes:

EC3 - Mechanical -> HvacPumps

Product Composition Diagram

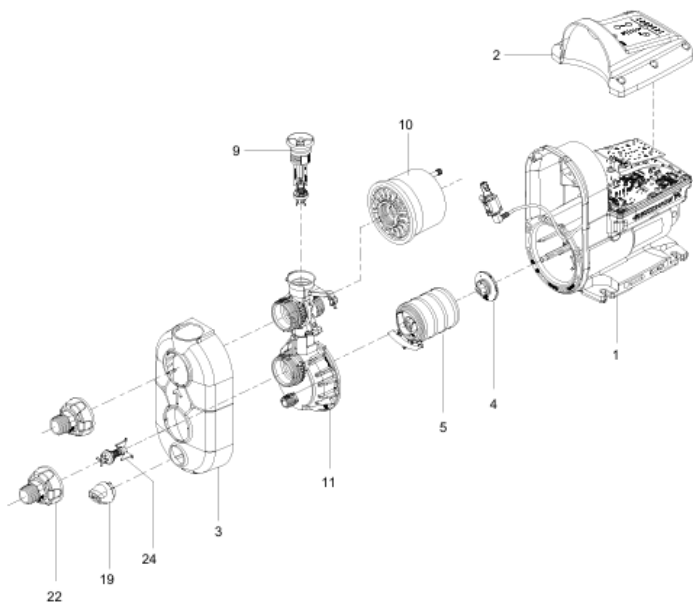


Table 1. Material Composition

Material/Component Category	Origin	% Mass
Aluminium	None	24.26
Aluminium oxide	None	0.04
Brass	None	0.01
Carbon steel	None	13.75
Cardboard	None	14.00

Material/Component Category	Origin	% Mass
Copper	None	3.72
Rubber	None	0.38
Polymers and composites	None	21.05
Electronics	None	1.94
Paper	None	1.27
Stainless steel	None	13.34
Wood	None	4.04
Grease, lubricant	None	0.21
Ferrite powder	None	1.99

Packaging Material	Origin	kg Mass
Cardboard	None	1.721
Paper	None	0.156
Wood	None	0.497

Biogenic Carbon Content	kg C per piece
Biogenic carbon content in product	0None
Biogenic carbon content in accompanying packaging	0.956

Hazardous Materials
EU REACH SVHC: Yes (candidate list date 25-Jun-2025; at least one partial article contains SVHC > 0.1 % by mass)
Lead monoxide — CAS 1317-36-8 (Toxic to Reproduction)
1-Butanesulfonic acid, 1,1,2,2,3,3,4,4,4-nonafluoro-, potassium salt — CAS 29420-49-3 (Persistent, Bioaccumulative and Toxic)
Lead — CAS 7439-92-1 (Toxic to Reproduction; some data submitters indicate Carcinogenic)

EPD Data Specificity

Primary Data Year:	2025
Manufacturing Specificity:	✗ Industry Average ✗ Manufacturer Average

✓ Facility Specific

Averaging:

Averaging was not conducted for this EPD.

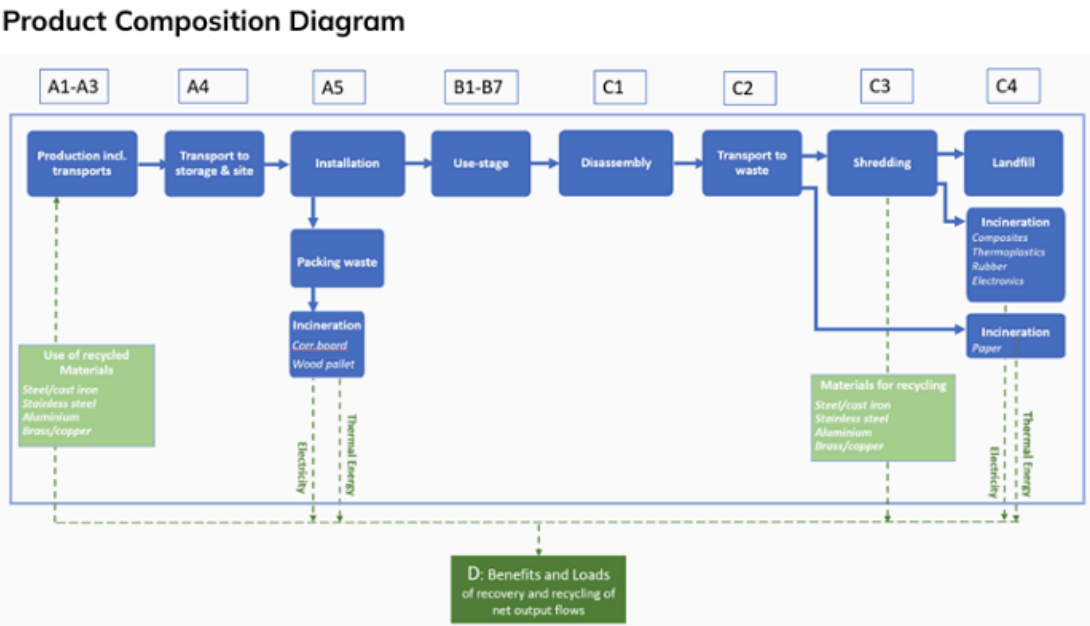
Table 2. System Boundary

Production	A1	Raw material supply	✓
	A2	Transport	✓
	A3	Manufacturing	✓
Construction	A4	Transport to site	✓
	A5	Assembly / Install	✓
Use	B1	Use	✓
	B2	Maintenance	✓
	B3	Repair	✓
	B4	Replacement	✓
	B5	Refurbishment	✓
	B6	Operational Energy Use	✓
	B7	Operational Water Use	✓
End of Life	C1	Deconstruction	✓
	C2	Transport	✓
	C3	Waste Processing	✓
	C4	Disposal	✓
Benefits & Loads Beyond System Boundary	D	Recycling, Reuse Recovery Potential	✓

Note:

ND = Module not declared

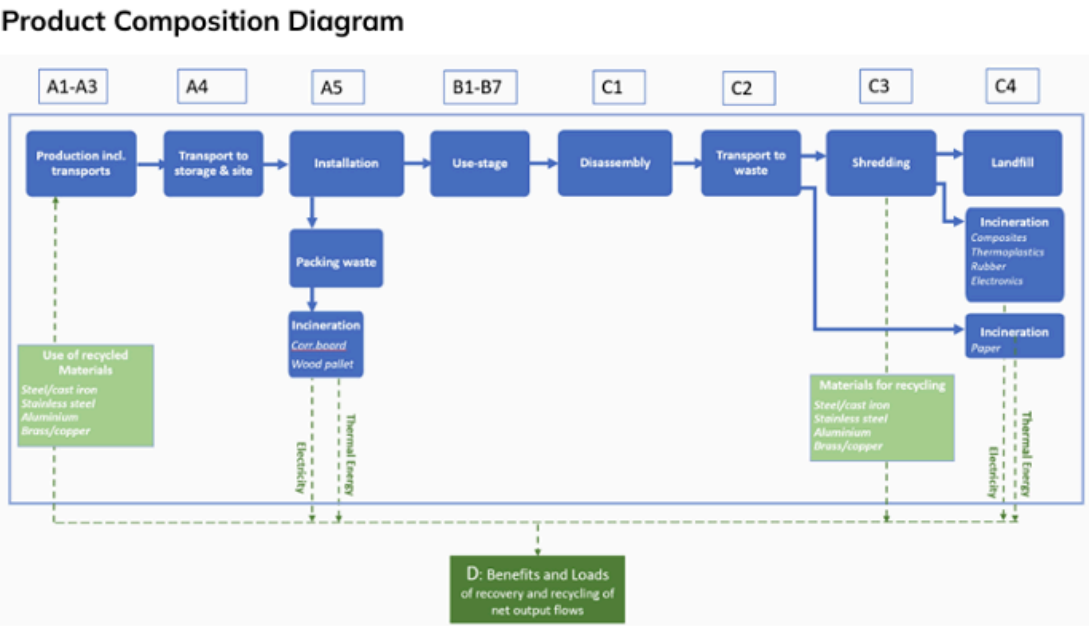
Product Composition Diagram



Plants

- Grundfos Serbia (GMS1) Obilaznica 21, Inđija, Serbia
- Grundfos Serbia (GMS1) Obilaznica 21, Inđija, Serbia
- Grundfos Serbia (GMS1) Obilaznica 21, Inđija, Serbia

Product Flow Diagram



Every Scala2 pump is assembled in Serbia at Grundfos Indija production plant (GMS1). Some plastic components of Scala2 product are injection molded also in Indija plant, other components are produced at or sourced from Hungary, Italy and Denmark. The steps of the final assembly process are partly manual and comprise 1) Shaft and motor stool assembly on motor; 2) Mounting of the shaft seal and insertion of impeller; 3) Mounting of sensor; 4) Joining the motor and impeller assembly with the pump housing, using the clamp ring [=complete pump]; 5) Semi-automated functional tests and software test & upload; and finally 6) Manual packing of Scala2 on wooden pallet, adding manuals and topping with cardboard box. The declared unit is one piece (pce.) of a SCALA2 3-45 115V 60HZ NEMA 5-15 plug pump variant (for US market) whose mass including packaging is provided in the Pump technical data table.

Software And Database

LCA Software:

Sphera LCA for Experts (formerly GaBi) v. 10.9

LCI Foreground Database(s):

Sphera Managed LCA Content (formerly GaBi Professional Database) v. 2024.2

GLO

LCI Background Database(s):

Ecoinvent v. 3.10 | RoW

A foreground LCI database is the database used to model the primary, site-specific data collected for this EPD. A background LCI database is the database used to model generic or non-specific data.

Data Quality

Precision: Primary data applied for the LCA is considered accurate: It is based on current SCALA2 bills of material (BOM) that are used for production at the plant, and that have been quality-assured with calculated mass balances. Data for allocation of energy to the assembly process is based on measurements; seasonal variations were balanced out by using annual data. SCALA2 makes up a small proportion of the total energy consumption and the mass-based allocation represents a conservative estimate of the consumption. All other primary data applied for the LCA are accurately quantified. The generic datasets are based on Sphera and Ecoinvent data, used worldwide in many critically reviewed and published studies, with documented precision. **Completeness:** Each unit process was checked for mass balance and completeness of the inventory. All relevant process steps were considered and modelled to represent specific situations. The modelled product system is considered sufficiently complete. **Consistency:** To ensure consistency, all specific data were collected with the same level of detail, while generic data were sourced primarily from Sphera, otherwise from the Ecoinvent databases. The application of both databases may lead to partial inconsistencies that were limited as far as possible to not jeopardize completeness and representativeness. Allocation and other methodological choices were made consistently throughout the study. All assumptions, methods, and data were found to be consistent with the study's goal and scope. **Reproducibility:** Reproducibility is warranted as much as possible through the disclosure of input-output data, dataset choices, and modelling approaches in this report. Based on this information, any third party should be able to approximate the results of this study using the same data and modelling approaches. **Representativeness:** All primary data are representative from temporal, technological and geographical perspective. Generic data come from the most updated (2024.2) versions of the Sphera and Ecoinvent databases. The data quality ranges from Fair to Very good except for some datasets that has Poor time representative data quality. Across all three data quality categories the datasets are considered overall Good.

Life Cycle Module Description

Scope: This declaration applies to 1 piece of SCALA2 3-45 115V 60HZ NEMA 5-15 plug (US version). The declaration covers the following variant: SCALA2 3-45 115V 60HZ NEMA 5-15 plug for the US market PN number: 93013251. The product is assembled in Serbia. The life cycle assessment is based on data collected from the ERP system of the manufacturer, including data from the manufacturing plant. This EPD is classified as a Cradle-to-Grave and module D. All major steps from the extraction of natural resources to the final disposal of the product are included in the scope of the study, following the modular approach of ISO 21930. Modules A1-A3 refer to the product stage and include raw materials extraction and processing, transportation, and the manufacturing process. The product stage is included in this study, and according to ISO 21930 the system boundary with nature is set to include those processes that provide the material and energy inputs into the system and the following manufacturing, transport up to the factory gate, as well as the processing of waste arising from those processes. The assembly of the product, as well as the packaging, are included in A3. Wastes and losses are included in the modules where they occur according to the polluter pays principle and the modular approach of ISO 21930. Module A4 regards the transportation from the production site to the regional distribution centre, and finally to the construction and product application site. Module A5 refers to the installation process of the pump including the transportation of packaging waste to the treatment site and the waste treatment of packaging. The use of energy during installation is negligible for the selected functional unit. Modules B1-B7 refer to the use stage. All use stage modules are assessed in the study, though B1, and B7 are assessed to be zero. The modules B3, B4 and B5 are declared as "MNR" (module not relevant). Module B2 regards to the maintenance within RSL (Reference Service Life). Module B6 regards energy use during the operation of the pump and includes the electricity consumption of the product. The total electricity consumption over the reference service lifetime is assessed by calculating the average power input using a specified load profile and multiplying it with the number of running hours per year and the number of years of the RSL. Modules C1-C4 refer to the End-of-life stage. A product reaches the end-of-life of its service life when it no longer provides any functionality. This life cycle stage includes all activities from the end-of-life of the pump until all materials and components are processed, reused, recycled, or disposed of. C1 regards the dismantling of the pump, and this module is a manual activity. C2 regards the transport to waste processing, C3 refers to the processing (shredding) of waste for recycling, and C4 refers to waste disposal: landfilling and incineration. Module D refers to the burdens and benefits beyond the system boundaries. According to ISO 21930, module D includes the reuse, recovery and/or recycling potentials, expressed in net impacts and benefits. Contributions to module D come from waste incineration processes in A5 and C4, as well as material (metal) recycling in C3. The specific fractions and net flows are shown in the scenarios section of this declaration.

LCA Discussion

Allocation Procedure

In principle, allocation should be avoided as far as possible. However, for the Scala2 assembly process in Serbia, energy consumption in the plant cannot be unambiguously allocated to the Scala2 production line alone, and an allocation procedure must be applied. The Serbian Grundfos plant manufactures numerous small and large components as well as finished, saleable products. Scala2 is just one of the product series being manufactured. This is not co-production since the other components and products are manufactured independently from Scala2, and out of studied product system. Nevertheless, to enable allocation of the energy use of the full plant to the production of one Scala2 unit, a mass-based fraction calculation of the full plant production was applied. This is in accordance with instructions in the PCR-A section 7.2.3. Allocation.

Cut-off Procedure

The criteria for the exclusion of inputs and outputs (cut-off rules) in the LCA and information modules and any additional information follow the requirements in ISO 21930 and the PCR Part A:- All inputs and outputs to a unit process shall be included in the calculation, for which data are available. Data gaps may be filled by conservative assumptions with average or generic data. Any assumptions for such choices shall be documented.- In case of insufficient input data or data gaps for a unit process, the cut-off criteria shall be 1 % of renewable and non-renewable primary energy usage and 1 % of the total mass input of that unit process. The total of neglected input flows per module, e.g. per module A1-A3, A4-A5, B1-B5, B6-B7, C1-C4 and module D shall be a maximum of 5 % of energy usage and mass. Conservative assumptions in combination with plausibility considerations and expert judgement can be used to demonstrate compliance with these criteria.- Particular case should be taken to include material and energy flows known to have the potential to cause significant emissions into the air and water or soil related to the environmental indicators of this standard. Conservative assumptions in combination with plausibility considerations and expert judgement can be used to demonstrate compliance with these criteria.

Renewable Electricity

Energy Attribute Certificates (EACs) such as
Renewable Energy Certificates (RECs) or Power
Purchase Agreements (PPAs) are included in the
baseline reported results:

✗ No

Scenarios

Transport to the building/construction site (A4)

A4 Module

Fuel Type:	diesel
Liters of Fuel:	1.7 l/100km
Transport Distance:	13297.9 km
Assumptions for scenario development:	Transport from the production site (Indija, Serbia) to the US regional distribution centre and application site. Fuel consumption 1.7 l diesel per 100 tkm; transport distance 13,297.9 km.

Installation in to the building/construction site (A5)

A5 Module

Installation Scrap Rate Assumed:	0 %
Ancillary Materials:	0 kg
Net Fresh Water Consumption Specified by Water Source and Fate:	0 m3
Other Resources:	0 kg
Electricity Consumption:	0 kWh
Other Energy Carriers:	0 MJ
Product Lost per Declared/Functional Unit:	0 kg
Waste Materials at the Construction Site Before Waste Processing:	0 kg
Output Materials Resulting from On-site Waste Processing:	0 kg
Mass of Packaging Waste Specified by Type:	2.223 (incinerated) kg
Biogenic Carbon Contained in Packaging (kg C):	0.956 kg
Direct Emissions to Ambient Air, Soil and Water:	0 kg
VOC Emissions:	0 ug/m3
Assumptions for scenario development:	Installation energy is negligible for the declared unit. Packaging (cardboard, paper, wood) becomes waste at A5 and is incinerated with energy recovery.

Use (B1)

B1 Module

ESL:	10 Years
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Maintenance (B2)

B2 Module

Maintenance Cycle:	3 Cycles/RSL
Maintenance Process Information:	Module B2 (maintenance) is declared and covers replacement service parts over the 10-year RSL (declared for the entire RSL). Detailed B2 scenario per the Grundfos background report.
Further assumptions for scenario development:	The B2 module involves all the environmental impacts from the raw material extraction to the end of life. All the components were produced in Serbia, at the same production plant (GMS1), where the pumps were manufactured. In the "Service kits Unpacking" plan, the same transportation data has been used like for the A4 stage transportation from factory gate to the end customer and 200 km/cycle of road travel by service technician (respectively 600 km/10 years of RSL) has been added to the model. During the 10 years of RSL, 3 cycles of maintenance is necessary.

Repair (B3)

B3 Module

Repair Cycle:	0 Cycles/RSL
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Operational Energy Use (B6) & Operational Water Use (B7)

B6 & B7 Modules

Net Fresh Water Consumption Specified by Water 0 m³

Source and Fate:

Energy Input: 839.7 kWh

Characteristic Performance:

RSL = 10 years operational time: 3625 h/year Electricity consumption: 839.7 kWh/year

Further assumptions for scenario development:

Reference Service Life (RSL): For pump products like the declared unit, an RSL of 10 years can be assumed according to the guideline by Europump (2024).

Therefore, to facilitate building reference calculations, an RSL of 10 years is declared. The number of running hours per year is assumed to be 3625 h according to the guideline Europump (2024). Average power input 0.232 kW from the specified load profile

End of Life (C1 - C4)

C1 - C4 Modules

Collection Process

Collected with Mixed Construction Waste:	10.067 kg
Transportation distance (C2):	322 km
Aluminium for recycling:	2.83 kg
Steel for recycling:	0.97 kg
Stainless steel for recycling:	1.21 kg
Copper for recycling (incl. brass):	0.34 kg
Plastics for incineration w/energy:	2.57 kg
Electronics for incineration w/energy:	0.0228 kg

Recovery

Reuse:	0 kg
Recycling:	5.35 kg
Landfill:	3.4334 kg
Incineration with Energy Recovery:	2.5928 kg
Transportation distance (C2):	322 km
Aluminium for recycling:	2.83 kg
Steel for recycling:	0.97 kg
Stainless steel for recycling:	1.21 kg
Copper for recycling (incl. brass):	0.34 kg
Plastics for incineration w/energy:	2.57 kg
Electronics for incineration w/energy:	0.0228 kg

Disposal

Transportation distance (C2):	322 km
Aluminium for recycling:	2.83 kg
Steel for recycling:	0.97 kg
Stainless steel for recycling:	1.21 kg
Copper for recycling (incl. brass):	0.34 kg
Plastics for incineration w/energy:	2.57 kg
Electronics for incineration w/energy:	0.0228 kg

Assumptions for scenario development:

End-of-life routing of the net product (10.067 kg), geography United States, per ECO Platform (2024): metals to recycling — Aluminium 2.83 kg, Steel 0.97 kg, Stainless steel 1.21 kg, Copper (incl. brass) 0.34 kg; plastics 2.57 kg and electronics 0.0228 kg to incineration with energy recovery; 3.4334 kg to landfill. C2 transport distance 322 km. Assumption: 95 % collected as electrical/electronic waste, 5 % to landfill.

Transportation distance (C2):	322 km
Aluminium for recycling:	2.83 kg
Steel for recycling:	0.97 kg
Stainless steel for recycling:	1.21 kg
Copper for recycling (incl. brass):	0.34 kg
Plastics for incineration w/energy:	2.57 kg
Electronics for incineration w/energy:	0.0228 kg

Reuse, Recovery and / or Recycling Potentials & Relevant Scenario Information (D)

D Module

Further assumptions for scenario development:	Module D includes net benefits from metal recycling (C3, the surplus over secondary material input to A1–A3) plus energy recovery from packaging incineration (A5) and waste incineration (C4).
A5, Packaging incineration w/ energy recovery (Electricity):	4.85 MJ
A5, Packaging incineration w/ energy recovery (Thermal energy):	8.79 MJ
C3, Aluminium for recycling (net output flow):	2.83 kg
C3, Steel for recycling (net output flow):	0.97 kg
C3, Stainless Steel for recycling (net output flow):	1.21 kg
C3, Copper for recycling (net output flow):	0.34 kg
C4, Waste incineration w/ energy recovery (Electricity):	0.1 MJ
C4, Waste incineration w/ energy recovery (Thermal energy):	0 MJ

Results

Table 3. Environmental Impact Assessment Results

TRACI 2.2

per 1 piece of product.

LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Impact Category	Unit	Method	A1 - A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	TRACI 2.2	5.93e+1	4.18e+0	3.28e+0	0	1.34e+2	ND	ND	ND	4.10e+4	0	0	1.67e-1	1.68e-1	5.82e-1	-9.01e+0
GWP-total (excl biogenic)	kg CO2 eq	TRACI 2.2	6.24e+1	4.18e+0	1.08e-1	0	1.33e+2	ND	ND	ND	4.03e+4	0	0	1.64e-1	1.66e-1	4.23e-1	-8.96e+0
GWP-total (incl biogenic)	kg CO2 eq	TRACI 2.2	5.85e+1	4.13e+0	3.28e+0	0	1.33e+2	ND	ND	ND	4.03e+4	0	0	1.65e-1	1.66e-1	5.16e-1	-8.92e+0
ODP	kg CFC 11 eq	TRACI 2.2	1.43e-8	9.42e-13	5.13e-13	0	1.92e-3	ND	ND	ND	3.57e-7	0	0	4.68e-14	1.47e-12	4.32e-13	-1.76e-10
AP	kg SO2 eq	TRACI 2.2	6.15e-1	3.86e-2	8.01e-4	0	3.29e-1	ND	ND	ND	4.88e+1	0	0	7.77e-4	2.01e-4	5.90e-4	-5.12e-2
EP-freshwater	kg P eq	TRACI 2.2	2.52e-4	3.32e-6	3.77e-8	0	2.62e-4	ND	ND	ND	6.09e-3	0	0	1.35e-7	2.50e-8	2.61e-5	-4.72e-6
EP-marine	kg N eq	TRACI 2.2	9.74e-2	3.31e-2	5.98e-4	0	2.62e-1	ND	ND	ND	2.04e+1	0	0	7.23e-4	8.39e-5	2.79e-4	-1.25e-2
POCP	kg O3 eq	TRACI 2.2	3.43e+0	1.04e+0	1.98e-2	0	6.49e+0	ND	ND	ND	7.30e+2	0	0	1.79e-2	3.03e-3	1.04e-2	-4.53e-1
HTP-c	CTUh	TRACI 2.2	7.58e-7	2.74e-11	1.60e-11	0	8.74e-8	ND	ND	ND	3.80e-6	0	0	1.49e-12	1.65e-11	6.29e-12	-6.19e-8
HTP-nc	CTUh	TRACI 2.2	7.14e-10	1.53e-10	3.28e-13	0	3.63e-7	ND	ND	ND	7.95e-8	0	0	2.45e-12	3.27e-13	2.33e-12	-3.24e-11
ETP-fw	CTUe	TRACI 2.2	1.50e+0	6.64e-1	1.21e-3	0	1.66e+1	ND	ND	ND	2.41e+2	0	0	1.08e-2	9.91e-4	7.51e-3	-5.34e-2
PM	kg PM2.5 eq	TRACI 2.2	5.12e-2	3.20e-3	2.49e-5	0	9.88e-3	ND	ND	ND	3.43e+0	0	0	1.83e-5	1.58e-5	4.44e-5	-6.26e-3

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

GWP = Global Warming Potential, 100 years (may also be denoted as GWP-total, GWP-fossil (fossil fuels), GWP-biogenic (biogenic sources), GWP-luluc (land use and land use change)), ODP = Ozone Depletion Potential, AP = Acidification Potential, EP = Eutrophication Potential, SFP = Smog Formation Potential, POCP = Photochemical oxidant creation potential, ADP-Fossil = Abiotic depletion potential for fossil resources, ADP-Minerals&Metals = Abiotic depletion potential for non-fossil resources, WDP = Water deprivation potential, PM = Particular Matter Emissions, IRP = Ionizing radiation, human health, ETP-fw = Eco-toxicity (freshwater), HTP-c = Human toxicity (cancer), HTP-nc = Human toxicity (non-cancer), SQP = Soil quality index.

Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project, before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase when product performance and specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted. Any comparison of EPDs shall be subject to the requirements of ISO 21930 or EN 15804. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries. EPDs are not comparative assertions and are either not comparable or have limited

comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparison can be inaccurate, and could lead to erroneous selection of materials or products which are higher-impact, at least in some impact categories.

Table 4. Resource Use Indicator

per 1 piece of product.

Indicator	Unit	A1 - A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	2.24e+2	2.62e+0	2.47e+0	0	1.54e+2	ND	ND	ND	1.95e+5	0	0	8.87e-2	8.00e-1	2.63e+0	-1.82e+1
PERM	MJ	4.55e+0	0	-2.22e+0	0	0	ND	ND	ND	0	0	0	0	0	-2.34e+0	0
PERT	MJ	2.28e+2	2.62e+0	2.53e-1	0	1.54e+2	ND	ND	ND	1.95e+5	0	0	8.87e-2	8.00e-1	2.97e-1	-1.82e+1
PENRE	MJ	8.33e+2	5.25e+1	1.45e+0	0	1.72e+3	ND	ND	ND	6.72e+5	0	0	2.13e+0	2.76e+0	5.84e+1	-1.04e+2
PENRM	MJ	5.98e+1	0	-2.42e-1	0	0	ND	ND	ND	0	0	0	0	0	-5.65e+1	0
PENRT	MJ	8.93e+2	5.25e+1	1.21e+0	0	1.72e+3	ND	ND	ND	6.72e+5	0	0	2.13e+0	2.76e+0	1.87e+0	-1.04e+2
SM	kg	6.41e+0	0	0	0	8.91e-1	ND	ND	ND	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	ND	ND	ND	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	ND	ND	ND	0	0	0	0	0	0	0
FW	m3	5.39e-1	1.65e-3	9.25e-3	0	1.97e-1	ND	ND	ND	2.57e+2	0	0	9.57e-5	1.05e-3	3.81e-4	-1.13e-1

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

RPRE or PERE = Renewable primary resources used as energy carrier (fuel), RPRM or PERM = Renewable primary resources with energy content used as material, RPRT or PERT = Total use of renewable primary resources with energy content, NRPRE or PENRE = Non-renewable primary resources used as an energy carrier (fuel), NRPRM or PENRM = Non-renewable primary resources with energy content used as material, NRPRRT or PENRT = Total non-renewable primary resources with energy content, SM = Secondary materials, RSF = Renewable secondary fuels, NRSF = Non-renewable secondary fuels, RE = Recovered energy, ADPF = Abiotic depletion potential, FW = Use of net freshwater resources, VOCs = Volatile Organic Compounds.

Table 5. Waste and Output Flow Indicators

per 1 piece of product.

Indicator	Unit	A1 - A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	3.75e-1	5.32e-9	5.38e-10	0	1.74e-2	ND	ND	ND	3.99e-4	0	0	3.53e-10	1.64e-9	3.98e-10	-6.49e-4
NHWD	kg	3.47e+0	5.84e-3	9.25e-2	0	5.49e-1	ND	ND	ND	2.31e+2	0	0	2.18e-4	9.49e-4	3.81e+0	6.40e-1
RWD	kg	2.08e-2	1.35e-4	5.01e-5	0	5.13e-3	ND	ND	ND	6.59e+1	0	0	7.32e-6	2.71e-4	2.59e-5	-4.40e-4
CRU	kg	0	0	0	0	0	ND	ND	ND	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	1.46e-1	ND	ND	ND	0	0	0	0	5.29e+0	0	0
MER	kg	0	0	0	0	0	ND	ND	ND	0	0	0	0	0	0	0
EEE	MJ	0	0	4.85e+0	0	1.57e+0	ND	ND	ND	0	0	0	0	0	1.00e-1	0
EET	MJ	5.04e-1	0	8.79e+0	0	7.17e+0	ND	ND	ND	0	0	0	0	0	0	0

Note:

Not all abbreviated indicators listed below may be present in the results above. The inclusion of indicators varies based on PCR requirements.

Abbreviations:

HWD = Hazardous waste disposed, NHWD = Non-hazardous waste disposed, RWD = Radioactive waste disposed, HLRW = High-level radioactive waste, ILLRW = Intermediate- and low-level radioactive waste, CRU = Components for re-use, MFR or MR = Materials for recycling, MER = Materials for energy recovery, MNER = Materials for incineration, no energy recovery, EE or EEE = Recovered energy exported from the product system, EET = Exported thermal energy.

Interpretation

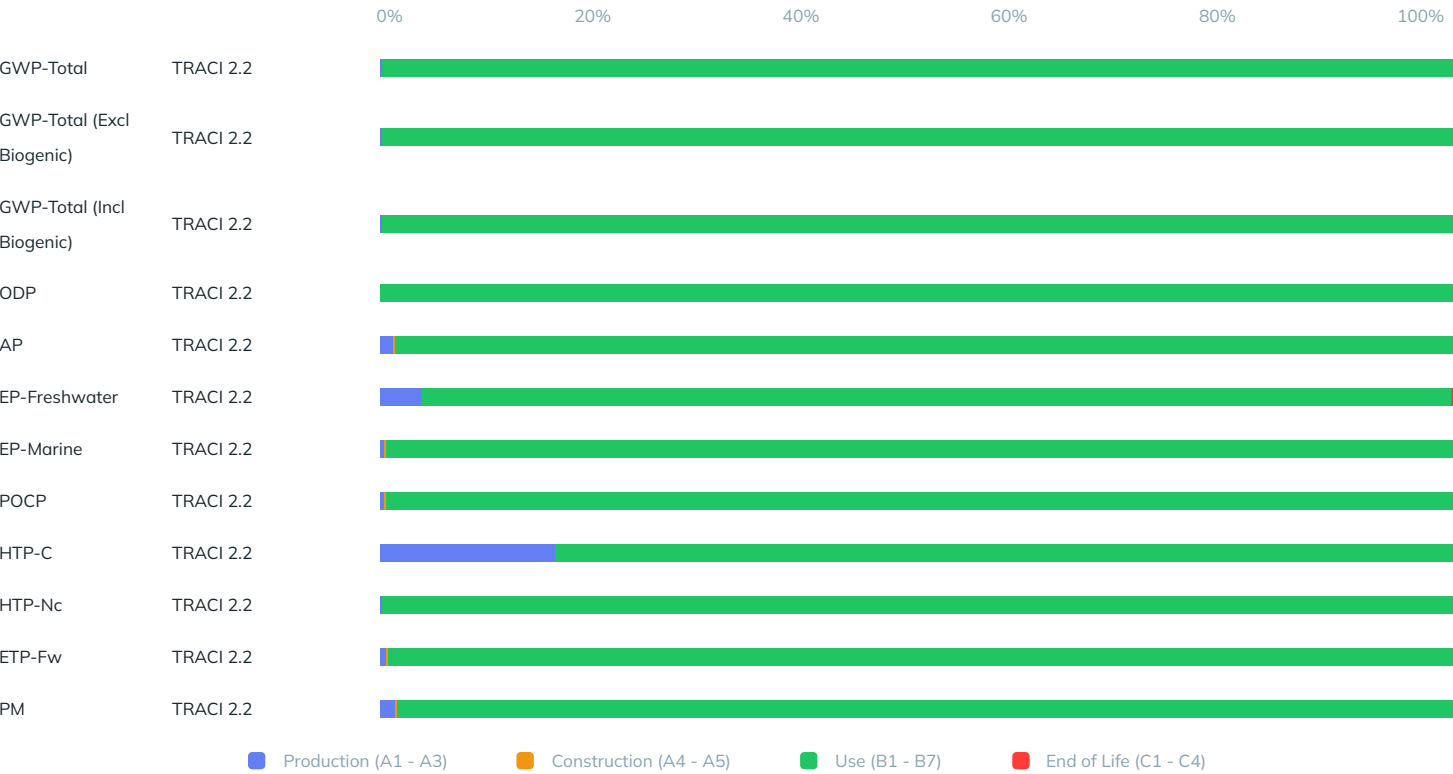
All calculated indicators were analyzed to check for consistency, trends, etc. in the results. The interpretation of the core environmental impact indicators is described here.

The trend of all indicators was clear.

The major contributors are generally B6 and A1-A3. Regardless of whether B6 of 10 years or 1 year is depicted, the use stage impact contributes significantly to the total impact. B6 impacts are entirely related to electricity consumption during the use stage.

Contributions to A1-A3 in terms of materials, transport, and energy are illustrated in the Grunfos LCA background report. The major contributors are the Steels and Electronics material fractions. It should be noted that the Energy accounted is merely energy for the final assembly; energy spent in sourcing materials and machining the individual components is inherent in the material fractions.

A detailed analysis of the electronics materials fraction clarified that impacts are primarily (>90%) due to the main populated wiring boards (PWB).



Further Information

References

STANDARDS:

ISO 14025: EN ISO 14025:2011, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

ISO 21930: ISO 21930:2017 Sustainability in buildings and civil engineering works — core rules for environmental product declarations of construction products and services.

FURTHER REFERENCES:

Software: Sphera LCA for Experts, v. 10.9.

Databases: Sphera Professional database, v. 2024.2; Ecoinvent database, v. 3.10.

Europump (2024): Use Phase GHG Emissions from Pump Units. A Europump Guide.

ECO Platform: LCA Calculation Rules and Specifications for EPDs. Version 2.0, December 2024.

Data booklet: Scala2 Grundfos Data Booklet. Available from Grundfos Product Center.

Smart EPD PCR-A v1.2: PART A PRODUCT CATEGORY RULES FOR BUILDING AND CONSTRUCTION PRODUCTS AND SERVICES Standard 1000, version 1.2, March 14, 2025