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Environmental
Product Declaration
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According to ISO 14025

Environmental Product Declaration

Xylem Flygt Concertor[®] 6020
Submersible Wastewater Pumps



FLYGT

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Environmental Product Declaration

Product Category	Submersible wastewater pumps Built for municipal and industrial applications
Geographical Scope	Europe
Program Operator	NSF International
EPD type	Type III Environmental Declaration according to ISO 14025 and EN 15804+A2
Declared unit	1 piece of Flygt Concertor® 6020 pump, including packaging
Scope	Cradle-to-Grave (modules A1–D)
Verification	Independent external verification by NSF International
Issue Date / Valid Until	06/02/2026 – 06/02/2031
PCR applied	Pumps for Liquids (IBU, 2024)

Sustainability at Xylem

Sustainability is at the core of our business strategy, reflecting our belief that advancing environmental stewardship and contributing to a more resilient society hand in hand with financial success.

Environmental Product Declaration

Program Operator	NSF International
General Program Instructions & Version	NSF Program Operator Rules, November 1, 2022
Manufacturer Name and Address	Xylem Water Solutions Global Services AB Stålvägen 2, 361 42 Lindås, Emmaboda, Sweden
Declaration Number	EPD11302
Declared Product & Functional Unit	one (1) piece of product, including packaging
Reference PCR & Version Number	PCR for Building-Related Products and Services Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report (v1.4, Institut Bauen und Umwelt e.V. (IBU)) Part B: Requirements on the EPD for Pumps for liquids and liquids with solids (v11, Institut Bauen und Umwelt e.V. (IBU))
Product Definition	Xylem Flygt Concertor 6020 Submersible wastewater pumps
Product RSL Description	10 Years
Markets of Applicability	European
Date of Issue	06/02/2026
Period of Validity	06/02/2026 – 06/02/2031
EPD Type	Product-Specific
EPD Scope	Cradle to grave
Year of reported primary data	2024
LCA Software & Version Number	SimaPro v.10.2.0.1
LCI Database & Version Number	Ecoinvent v.3.11
LCIA Methodology & Version Number	EN 15804 + A2 (adapted) v1.03

This declaration was independently verified in accordance with ISO 14025: 2006.

INTERNAL

EXTERNAL

Joseph Geibig - EcoForm Consulting



This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:

Cher Xue, Program Manager – Carbon Strategy of TrueNorth Collective

MD Insaf Ali, Manager – Product Sustainability and Amol Niwalkar – Sr. Engineer of Xylem Water Solutions

This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:

Joseph Geibig - EcoForm Consulting



1 Product Definition and Information

1.1 Description of Company

Xylem Inc. (Xylem) is a global water technology provider, founded in 2011 as a spin-off from ITT Corporation, that designs and manufactures engineered solutions for water transport, treatment, testing, and smart metering.

1.2 Product Definition

Product Name

Flygt Concertor® 6020 Series Submersible wastewater pumps

Product Type

High-efficiency submersible wastewater pump range with a high-efficiency permanent magnet motor (IE4-equivalent) and Adaptive-N™ hydraulic technology

Manufacturing

Xylem Water Solutions Global Services AB, Emmaboda, Sweden

Application

Transportation of solids-bearing, water-based liquids designed for municipal, industrial, and commercial buildings applications.

Main materials

Cast iron, steel, aluminium, copper, engineered plastics, ceramics

Performance range

Head up to 30 m; Flow up to 361.33 m³/h; Average Power input 2.21 – 7.19kW

Further technical details for the product are available in the product specification brochure [here](#).

1.3 Certifications and Standards

Applicable EU Directives and Harmonized Standards:

- Machinery 2006/42/EC
- LVD 2014/35/EU
- EMC 2014/30/EU
- RoHS 2011/65/EU
- EN ISO 12100:2010
- EN 809+A1:2009/AC:2010

Product Standards and compliant to:

- EN 60034-1:2010/AC:2010
- EN IEC 63000:2018
- EN 61000-6-1:2007
- EN 61000-6-4:2007/A1:2011
- EN 60204-1:2018
- EN 61000-6-2:2005/AC:2005
- EN 61000-6-3:2007/A1:2011/AC:2012

Manufacturing site certification:

- ISO 9001:2015, ISO 14001:2015, ISO 45001:2018

1.4 Product Group Covered by the EPD:

This Environmental Product Declaration covers the most widely sold variants of the Flygt Concertor® 6020 Series Submersible Wastewater pumps. All declared products are manufactured at Xylem Water Solutions Global Services AB (Emmaboda, Sweden) and share the same core design, material composition and manufacturing processes. They differ primarily in size, hydraulic performance and control features. Flygt Concertor® 6020 series Submersible wastewater pumps, six variants are listed in Table 1 below:

Table 1: Product Included In The Study And Weight Per Declared Unit

Product Part Number	Product Weight (without packaging)	Total Product Weight (with packaging)	Unit
6020.182-0015	112	122	kg
6020.182-0011	118	135	kg
6020.182-0012	129	146	kg
6020.182-0145	112	122	kg
6020.182-0021	97	108	kg
6020.182-0075	94	104	kg

1.5 Declaration of Methodological Framework

This study provides life cycle inventory and environmental impacts relevant to Xylem Flygt Concertor® 6020 Series Submersible Wastewater pumps. The LCA follows an attributional approach as outlined in EN15804. System modeling was performed using the commercial LCA software SimaPro (version 10.2.0.1), developed by Pré Sustainability.

1.6 Technical Data

The technical specifications of the products are listed in the sections below.

Table 2: Constructional Data

Name	Value	Unit
Frequency	50-60 Hz	Hz
Flow Rate (max)		m3/h
6020.182-0015	105.6	m3/h
6020.182-0011	303.44	m3/h
6020.182-0012	361.33	m3/h
6020.182-0145	105.84	m3/h
6020.182-0021	105.6	m3/h
6020.182-0075	105.6	m3/h
Average Power Input (from load profile describing use)		
6020.182-0015	2.21	kW
6020.182-0011	7.19	kW
6020.182-0012	5.42	kW
6020.182-0145	2.22	kW
6020.182-0021	2.21	kW

Name	Value	Unit
6020.182-0075	2.21	kW
Nominal Capacity		
6020.182-0015	2.2	kW
6020.182-0011	7.3	kW
6020.182-0012	5.5	kW
6020.182-0145	2.2	kW
6020.182-0021	2.2	kW
6020.182-0075	2.2	kW
Voltage	200-240, 380-480	V
Energy Efficiency Index (EEI)	IE4	
Pumped Liquid	Wastewater	-
Head Max.		
6020.182-0015	20.42	m
6020.182-0011	30.04	m
6020.182-0012	15.86	m
6020.182-0145	20.51	m
6020.182-0021	20.42	m
6020.182-0075	20.42	m

Performance data of the product according to the harmonized standards, based on provisions for harmonization.

1.7 Raw Materials (A1)

The main materials are cast iron, steel, aluminum, copper, engineered plastics and ceramics. The material composition among the 6 products is similar.

Table 3: Base materials/Ancillary materials

Name	Value	Unit
Cast Iron	41 - 63	%
Steel	11 - 14	%
Packaging	8 - 12	%
Engineered plastics and ceramics	7 - 12	%
Aluminum	4 - 21	%
Copper	3	%
Miscellaneous Hardware	2	%

1.8 Transportation (A2, A4)

Transportation includes the delivery of supplied materials to Xylem facility for manufacturing and assembly, transport of scrap to waste treatment, and the transport of product to customer locations.

1.9 Packaging (A3)

The packaging materials include corrugated board, wood pallet, LDPE, PET and PP. Packaging weights by materials are summarized in table below.

Table 4: Product Packaging Materials Weight

Name	Value	Unit
Corrugated board	5 - 8.5	kg
Wood Pallet	5 - 8	kg
LDPE	0.2	kg
PET	0.135	kg
PP	0.009	kg

1.10 Manufacturing (A3)

Manufacturing of Flygt Concertor® 6020 Series pumps includes cast iron component production, machining of components, painting pre-treatment, final assembly, painting top coating, and packaging, as described in a simple flow diagram in Figure 1 below.

Manufacturing includes material and energy inputs into the system, during manufacturing processes, and the processing of any waste arising from the processes. Wastes and losses are included in the module.

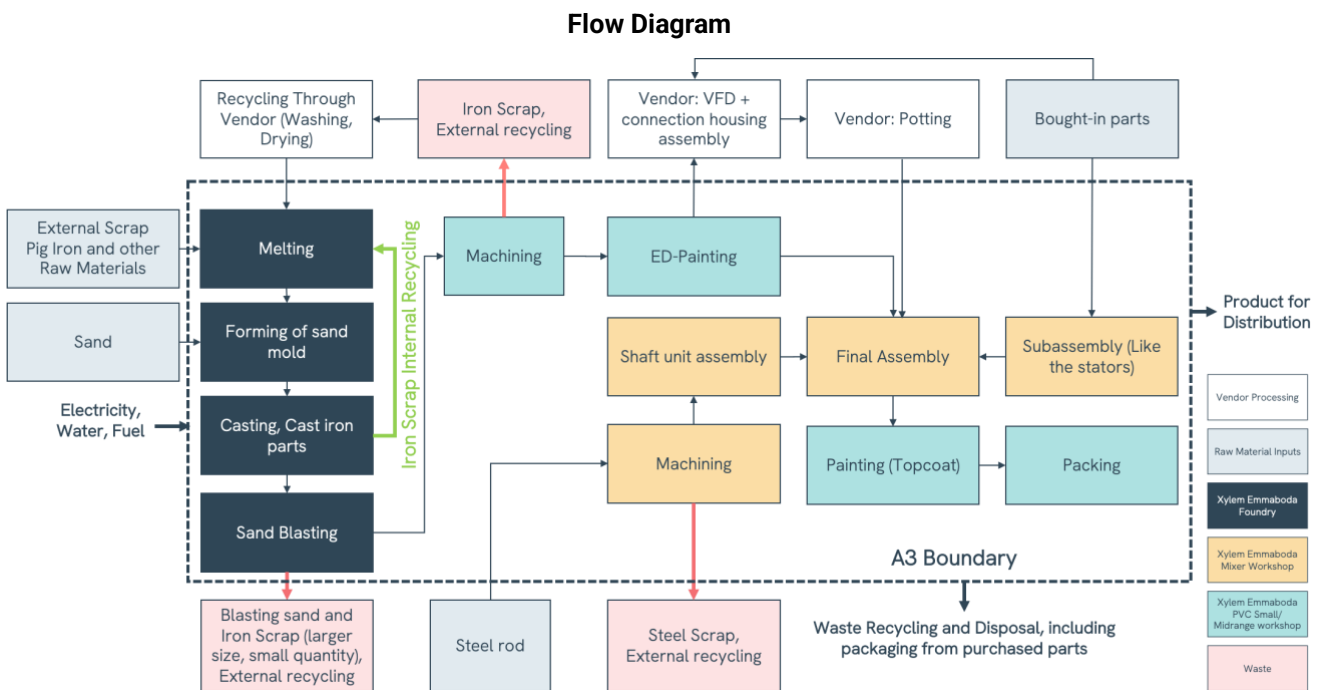


Figure 1: Manufacturing Flow Diagram

1.11 Product Installation (A5)

The installation process uses tools and takes 0.2 kWh of electricity. A5 also includes packaging waste treatment, in accordance with EN 15804+A2. The percentages per EOL treatment method shown below are taken from the latest updated Eurostat Data Browser for 2022, for European Union - 27 countries.

Table 5: Packaging End of Life Assumptions

Name	EOL Treatment	Value
Plastics	Recycled	94.17%
	Landfill	5.83%
Paper and Paperboard	Recycled	99.97%
	Landfill	0.03%
Wood	Recycled	99.65%
	Landfill	0.35%

1.12 Maintenance (B2)

Module B2 includes a basic repair kit shown below, the same amount of energy required for installation (0.2 kWh) as in module A5, and the treatment of waste generated from the removed parts, which are assumed to be made of the same materials as the repair kit.

The pumps designed for handling clean water, surface water, and wastewater containing solids or fibrous materials and are suitable for indoor and outdoor submerged wet-location applications. The maintenance interval is based on the following specification: "Up to 24,000 operating hours or six years, whichever comes first." In this case, the six-year limit applies, as the average annual operating time is approximately 1,300 hours.

Table 6: Repair Kit Materials

Name	Value	Unit
Steel	1.015	kg
Aluminum	0.060	kg
Engineered plastics	0.033	kg
Ceramics	0.146	kg
Elastomers	0.110	kg

1.13 Use (B6)

Operational energy use (B6) uses the average annual power consumption based on the input power representative for each product. The other use stage modules B1, B3-B5 and B7 are declared as having zero impacts as there is no water use during the use phase, nor are any direct emissions from the pump products once they are installed. The pumps do not require repair or replacement during use, apart from the one-time maintenance described in B2.

1.14 Reference Service Life

A Reference Service Life (RSL) is required because the EPD reports maintenance needs (module B2) and use-phase energy consumption (module B6). An estimated RSL of 10 years is used to facilitate building calculations. The use stage sub-module B6 is declared per year as required by the PCR Part B and a formula was provided in the results section for extrapolating B6 over the total life cycle. This estimate is based on a consensus EU assumption, as referenced in Table 36: Lot 28 - Commission Regulation (EU) No 547/2012 - Ecodesign Pump Review, by prepared for the European Commission.

At the same time, there is no definitive information on average service life of pumps. Actual lifetimes vary widely and are influenced by several factors, including installation conditions, operational profiles (constant or variable flow), and maintenance practices, as also highlighted in EU preparatory studies for pump ecodesign requirements.

1.15 Reuse, Recycling, and Energy Recovery

The material inputs to the cast iron foundry include externally sourced iron scrap and a closed-loop internal scrap flow. There is also secondary material included in the backgroundecoinvent dataset for other material inputs. No recovered energy or secondary fuels are generated during the life cycle. Majority of the cast iron scrap metal from manufacturing (A3) is reused internally within the system boundary. Other product scraps are sent to a third party for recycling.

At end-of-life (C1-C4), the pumps can be collected and shredded prior to recycling. The pumps can be manually disassembled, and the disassembled components and sub-assemblies are then passed through a shredder, followed by magnetic separation and eddy current separation to recover the different material. Metals such as cast iron and steel typically enter established recycling streams, while plastics and elastomers are treated through energy recovery or disposal, depending on local practices.

Module D reports the net benefits and burdens associated with these recycling and recovery processes in accordance with EN 15804+A2.

1.16 Disposal

The pumps are manually disassembled, after which the separated components and sub-assemblies are collected and mechanically shredded prior to recycling.

2 Life Cycle Assessment Background Information

2.1 Declared Unit

Definition: one (1) piece of product, including packaging

Conversion factors to 1 kg of the declared unit are provided in accordance with PCR Part A. Product total weight including packaging (kg per piece) provided in Table 1 can be used to convert results from one (1) piece of product to a per-kilogram-of-product basis.

2.2 System Boundary

The life cycle assessment follows a cradle-to-grave system boundary and includes modules A1–C4 and D, in accordance with EN 15804+A2.

Table 7. Description of the system boundary modules

Product Stage			Construction Process Stage		Use Stage							End Of Life Stage				Benefits And Loads Beyond The System Boundary
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw Material Supply	Transport	Manufacturing	Transport From Gate To Site	Assembly/ Install	Use	Maintenance	Repair	Replacement	Refurbishment	Building Operational Energy Use During Product Use	Building Operational Water Use During Product Use	Deconstruction	Transport	Waste Processing	Disposal	Reuse, Recovery, Recycling Potential
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

*MND: module not declared
 *X: module was declared

System Boundary Diagram

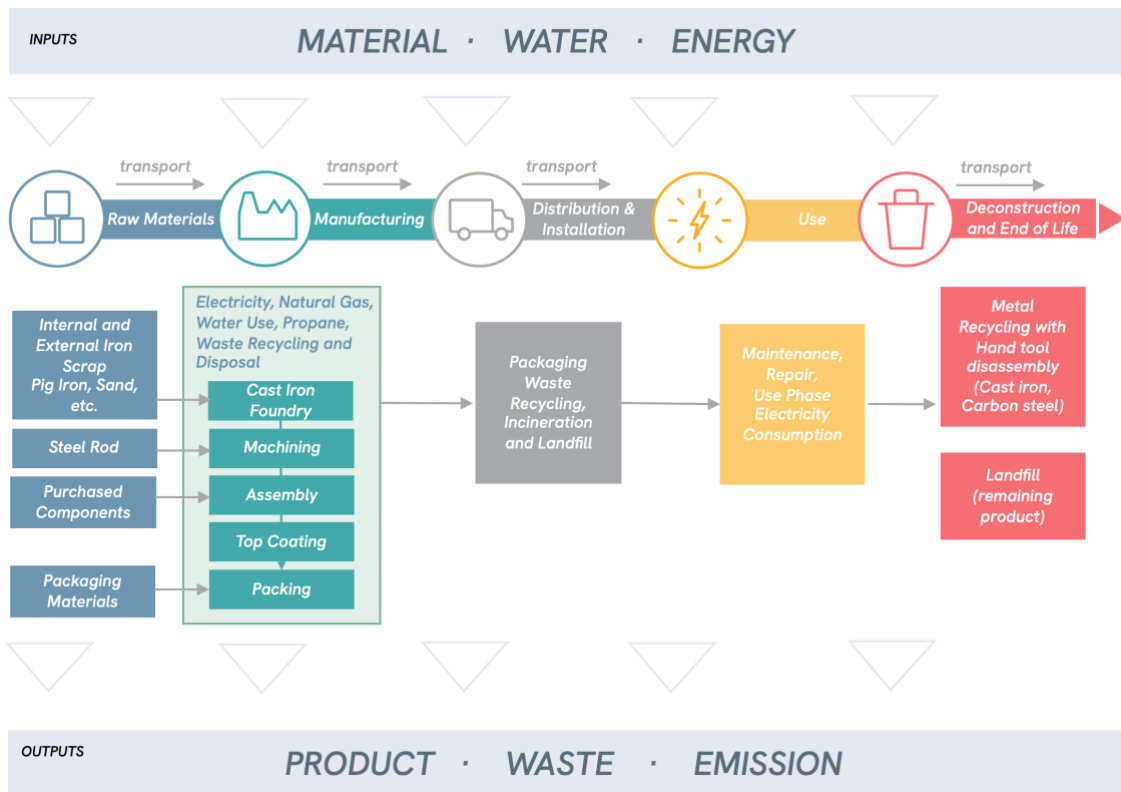


Figure 2: System Boundary Diagram

Included life cycle stages

A1–A3 (Product stage):

- A1: Raw material supply
- A2: Transport of materials to the manufacturing site
- A3: Manufacturing and assembly, including internal scrap reuse

A4–A5 (Construction stage):

- A4: Transport of packaged pumps from Xylem to customers
- A5: Installation stage, covering packaging waste generation only (Installation of the pump requires manual handling only and is modelled with zero additional impacts.)

B2, B6 (Use stage):

- B2: Electricity consumption during repair kit installation, material consumption and disposal of repair kit components
- B6: Electricity consumption during operation, calculated using size-class specific average annual power values as required by the PCR

Modules B1, B3–B5 and B7 are declared as having zero impact. The pumps do not require water consumption, repair, maintenance, or replacement within the declared year of use, and they generate no direct emissions during operation.

C1–C4 (End-of-life stage):

- C1: Not relevant (manual deinstallation; negligible impacts)
- C2: Transport to end-of-life treatment
- C3: Waste processing prior to recycling
- C4: Recycling

D (Benefits and loads beyond the system boundary):

- Potential benefits from recycling of metals and energy recovery of non-recyclable materials

General considerations

All relevant materials, energy inputs, auxiliary materials, and upstream and downstream processes required to produce one (1) packaged pump are included. Waste generation is modelled in the module where it occurs. External and internal cast iron scraps are used in module A1, and no recovered fuels or energy are generated during any life cycle stage.

2.3 Estimates and Assumptions

Manufacturing allocation: Electricity and all other manufacturing inputs allocated by mass per PCR requirements.

Packaging: Wood pallets used for product packaging are reused up to 70 times before being discarded. However, since the data are reported on a per-product basis and lack of shipment-level pallet tracking information, this reuse has not been allocated across multiple uses. As a result, the full pallet impact is attributed per use, representing a conservative assumption.

End-of-life: The pumps are manually disassembled, after which the separated components and sub-assemblies are collected and mechanically shredded prior to recycling.

Transport: Manufacturing wastes are assumed to travel 100 km. Packaging and end-of-life wastes are assumed to travel 500 km by truck to treatment facilities.

2.4 Cut-off Criteria

A mass-based cut-off criterion of 0.1% per component was applied. The cumulative excluded mass is below 2% of total product weight.

- Excluded items include minor fasteners (screws, nuts, washers, retaining rings), small sealing elements (O-rings, cuffs), auxiliary plastic parts (cable ties, tapes, insulating hoses), labels/stickers, and short-length copper connectors.
- Materials involved are primarily stainless steel, nitrile and fluorinated rubber, Polyvinyl Chloride (PVC), Nylon 12 (PA12), Polyphenylene Sulfide (PPS), and low-mass copper accessories. Digital elements such as software and configuration files were excluded as non-physical components. These exclusions are environmentally insignificant and do not influence identified impact hotspots, which are driven by major metal components, electronic assemblies and use-phase energy consumption.

The application of cut-off criteria does not affect the comparability of results and is consistent with the requirements of the relevant standards and program operator rules.

All other known material and energy flows within the system boundary are included. Primary data are used where available, supported by secondary datasets to close gaps. Representative proxies were applied only when primary information was not obtainable. In accordance with ISO 14044 and the applicable PCR, cut-off criteria have been applied only where data gaps exist and where exclusions are demonstrated to be environmentally insignificant.

The following minimum requirements are met:

- At least 95% of the total mass of the declared product is included.
- At least 95% of the total primary energy use is included.
- No excluded flow is expected to contribute more than 1% to total mass, energy use, or any relevant environmental impact category.
- The sum of all excluded flows does not exceed 5% of total mass or energy.

2.5 Background Data

This study uses both primary and secondary data. Primary information on raw materials, supplier locations, and manufacturing inputs/outputs was collected directly from Xylem and reviewed for accuracy. For internal process flows that do not represent direct exchanges with the environment, secondary datasets from EN15804 compliant version of Ecoinvent v3.11 (Cut-off by Classification), compiled in 2024, were used to model upstream and downstream processes.

2.6 Data Quality

Data quality was evaluated in accordance with the PCR:

Time coverage: Foreground data represent 2024 operations and meet the PCR requirement of being less than three years old and averaged over at least one year. The methodology applies a 100-year life cycle assessment (LCA) time horizon, which is standard practice in LCA and carbon foot printing. A 100-year LCA evaluates the total environmental impacts (e.g., CO₂e, energy use) of a product over its full cradle-to-grave life cycle, including manufacturing, use, maintenance, and end-of-life stages. This time horizon is commonly applied for long-lived materials and products and is consistent with the use of 100-year Global Warming Potentials (GWP100) in IPCC and ISO-based LCA methodologies.

Geographical coverage: Data reflects the Xylem manufacturing facility in Emmaboda, Sweden, and its associated supply chain.

Technological coverage: Data corresponds to the current manufacturing technologies used for the in-scope submersible wastewater pump products.

2.7 Period under Review

All the primary data in the scope of this EPD was collected from Xylem manufacturing facility for 2024.

2.8 Geographic Representativeness

This study covers the Xylem facility in Emmaboda, Sweden and Xylem's value chain where manufacturing is carried out for the products in this report.

2.9 Allocation

Allocation follows ISO 14040 and the PCR. Where possible, process subdivision was applied; otherwise, inputs and outputs were allocated using mass-based factors. This applies to plant utilities, resource use, ancillary materials, and waste streams.

There are total of five product groups manufactured in the facility, Mid-Range, Small Range, Mixer, G&G and Dewatering. The facility does not have submetering data that would allow further subdivision of these uses. Because the five product groups are manufactured using similar processes, most plant inputs and outputs were allocated per kg of product output across the facility. Subdivision for product and packaging raw material inputs and scrap amounts was made possible through product bills of materials (BOMs). Xylem confirmed that applying a uniform allocation across all products manufactured at the facility is appropriate. Background data from ecoinvent v3.11 include allocation as defined in the respective datasets.

The principle of modularity is followed in the study. Where processes influence the product's environmental performance during its life cycle, they shall be assigned to the module in the life cycle where they occur.

In accordance with the polluter pays principle, environmental burdens are assigned to the life cycle stage and process in which the emissions or resource use occur. Recycling is modeled using the cut-off approach: primary material production bears the burdens of raw-material extraction and processing, while recycled materials carry only the burdens of collection and reprocessing. Related benefits are reported in Module D.

2.10 Comparability

EPDs from different programs or based on different background data may not be directly comparable, even when developed using the same PCR. Meaningful comparison of construction products requires the use of identical system boundaries, life-cycle modules, scenarios, and data sets across the full life cycle.

Comparisons at component or system level are possible only when all relevant conditions defined in the PCR and EN 15804+A2 are met. The information provided in this EPD is presented transparently to support appropriate interpretation of comparability limitations.

3 Life Cycle Assessment Scenarios

The products under consideration do not contain biogenic content. Even in instances where such content may be present, it accounts for less than 5% of the total composition. Biogenic carbon content in the product is reported as null values, and the declaration of biogenic carbon content may be omitted according to the specified PCR.

The biogenic carbon content in the accompanying packaging is calculated based on the value included with the secondary dataset in ecoinvent database. The biogenic carbon content per declared unit of each packaging material is listed in Table 8 below. The total biogenic carbon content per declared unit is calculated by multiplying the corresponding packaging material weight by its biogenic carbon content value.

Table 8. Biogenic Content at factory gate

Name	Value	Unit
Biogenic carbon content in product	0	kg C
Biogenic carbon content in accompanying packaging	4.44 – 7.31	kg C

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

The products are distributed to more than various customer location in EU countries by truck. Customer-specific transport distances and modes to Emmaboda were calculated, and the model applies a weighted average distance per transport mode based on the percentage of orders provided by Xylem. A summary of these values is presented in Table 9 below.

Table 9. Transport to the building site (A4)

Name	Value	Unit
Liters of fuel	27.6 (diesel)	l/100km
Transport distance	2148 (Road)	km
Vehicle Type	lorry, 16-32 metric ton	-
Capacity utilization (including empty runs, mass based)	37	%
Product dimensions	0.252 – 0.370 (packaged, in delivery status)	m ³
Gross density of products transported	290 – 406	kg/m ³
Capacity utilization volume factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaging products)	=1	-

The installation process is manual, using hand tools that don't consume energy. Therefore, only product packaging waste is included in this module. It is assumed all packaging wastes are transported to a waste treatment facility with an average of 500 km by truck. The EOL treatment per kilogram of each total packaging materials is summarized in Table 10 below.

Table 10. Installation into the building (A5)

Name	Value	Unit
Ancillary materials	n.a.	kg
Net freshwater consumption specified by water source and fate (amount evaporated, amount disposed to sewer)	n.a.	m ³
Other resources	n.a.	kg
Electricity consumption	0.2	kWh
Other energy carriers	n.a.	MJ
Product loss per functional unit	n.a.	kg
Output materials resulting from on-site waste processing (specified by route; e.g. for recycling, energy recovery and/or disposal)	See breakdowns below	
Total Packaging – Recycled	10.30 – 16.79	kg
Total Packaging – Incinerated	0	kg
Total Packaging – Landfilled	0.04 – 0.05	kg
Dust in the air	n.a.	kg
VOC in the air	n.a.	kg

Module B2 includes a basic repair kit, the same amount of energy required for installation (0.2 kWh) as in module A5, and the treatment of waste generated from the removed parts, which are assumed to be made of the same materials as the repair kit. Information on maintenance is summarized in Table 11 below.

Table 11. Maintenance (B2)

Name	Value	Unit
Information on maintenance	Basic repair kit replacement; 0.2 kWh installation energy; removed parts treated as waste; maintenance interval: 6 years / 24,000 operating hours.	-
Maintenance cycle	1	Number/RSL
Water consumption	n.a.	M3
Auxiliary	1.364, See breakdown in Table 6	kg
Other resources	n.a.	
Electricity consumption	0.2	kWh
Other energy carriers	n.a.	MJ
Material loss	1.364	kg

Product use phase energy consumption is modeled based on the input power, determined by Xylem from pump performance testing in accordance with ISO 9906:2012. The annual total electricity consumption calculation is based on actual load profile of the variants at 100% head and 100% flow and a control factor of 0.9 according to Europump Life Cycle Assessment Guidelines for pump units and systems. Annual electricity consumption is summarized in Table 12 below based on 1300 annual operating hours.

Table 12. Pump Class Annual Electricity Use (B6)

Name	Value	Unit
Water Consumption	n.a.	M3
Electricity Consumption	See breakdowns below	
6020.182-0015	2874	kWh/yr
6020.182-0011	9345	kWh/yr
6020.182-0012	7041	kWh/yr
6020.182-0145	2887	kWh/yr
6020.182-0021	2869	kWh/yr
6020.182-0075	2873	kWh/yr
Other energy carriers	n.a.	MJ
Average power input	See breakdowns below	
6020.182-0015	2.21	kW
6020.182-0011	7.19	kW
6020.182-0012	5.42	kW
6020.182-0145	2.22	kW
6020.182-0021	2.21	kW
6020.182-0075	2.21	kW

Operational energy use declared per year as required by PCR.

The model assumes a 100% recycling rate that the pumps will be collected and shredded prior to recycling. First, certain components can be readily separated manually without the use of energy. The remaining disassembled components and sub-assemblies are then passed through a shredder, followed by magnetic separation and eddy current separation to recover the different materials. The End of Life Assumptions are summarized in Table 13 below, represented by product 6020.182-0015.

Table 13. End of life (C1-C4)

Name	Value	Unit
Collected separately	88.86	kg
Collected with mixed construction	22.97	kg
Reuse	n.a.	kg
Recycling	111.83	kg
Energy Recovery	n.a.	kg
Landfilling	n.a.	kg

Module D provides information on potential loads and benefits of secondary material, secondary fuel or recovered energy leaving the product system. Table 14 below summarizes the secondary materials being integrated in product and scrap materials generated during manufacturing and disposal, calculated based on product 6020.182-0015.

Table 14. Reuse, recovery and/or recycling potentials (D), relevant scenario information

Name	Value	Unit
Net output flow leaving the product system	29.89	kg
A1 - secondary material included in the cast iron production and background dataset fromecoinvent	129.85	kg
A3 - 100% of cast iron scrap produced at factories is recycled back into the manufacturing processes; other product scraps are recycled outside of the pump product system	14.22	kg
A5 - secondary material included in the background dataset fromecoinvent	0.80	kg
A5 - steel components of the repair kit are assumed to be recycled	0.91	kg
C4 - the products are assumed to be recycled with various recovered rate by materials	85.64	kg

4 Life Cycle Assessment Results

4.1 Life Cycle Assessment Results for 6020.182-0015

Modules B1, B3-B5 and B7 and C1 were considered in the scope of this study, but were deemed to not be relevant. Module C4 has zero impact due to recycling cut-off. As such, all impacts from these modules are zero and not shown in the results table in the section for simplicity.

Table 15. Core Environmental Impact Indicators – 6020.182-0015

Indicator	Unit	A1-A3	A4	A5	B2	B6	C2	C3	D
GWP-total	kg CO2 eq	4.00E+02	5.08E+01	1.66E+01	1.37E+01	9.44E+02	1.08E+01	1.19E+00	5.92E+01
GWP-fossil	kg CO2 eq	4.15E+02	5.08E+01	2.68E-01	1.37E+01	9.41E+02	1.08E+01	1.18E+00	5.93E+01
GWP-biogenic	kg CO2 eq	-1.63E+01	0.00E+00	1.63E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-luluc	kg CO2 eq	1.24E+00	1.67E-02	2.66E-04	2.94E-02	2.87E+00	3.55E-03	1.59E-03	-5.02E-02
ODP	kg CFC11 eq	9.90E-06	1.02E-06	5.23E-09	1.73E-07	1.73E-05	2.17E-07	7.87E-09	2.12E-07
AP	mol H+ eq	5.47E+00	2.79E-01	1.49E-03	1.91E-01	5.53E+00	5.94E-02	6.48E-03	1.30E-01
EP-freshwater	kg P eq	4.35E-01	3.39E-03	7.46E-05	2.01E-02	8.76E-01	7.23E-04	5.42E-04	-5.82E-03
EP-marine	kg N eq	1.31E+00	1.16E-01	5.70E-04	3.22E-02	8.68E-01	2.48E-02	1.20E-03	5.36E-02
EP-terrestrial	mol N eq	7.33E+00	1.27E+00	5.56E-03	6.58E-01	7.78E+00	2.71E-01	1.29E-02	2.65E-01
POCP	kg NMVOC eq	2.14E+00	4.20E-01	1.84E-03	6.78E-02	2.56E+00	8.96E-02	3.64E-03	1.34E-01
ADP-minerals&metals	kg Sb eq	6.00E-02	1.62E-04	1.52E-06	1.31E-03	1.26E-02	3.46E-05	1.07E-05	-8.78E-03
ADP-fossil fuels	MJ	9.42E+03	7.19E+02	4.37E+00	1.75E+02	2.19E+04	1.53E+02	1.51E+01	5.61E+02
WDP	m3 depriv.	2.36E+02	3.98E+00	6.10E-02	1.04E+01	7.41E+02	8.49E-01	2.79E-01	- 7.12E+00

GWP = Global warming potential; luluc = Land use and land use change; 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; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil fuels = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

Table 16. Additional environmental impact indicators – 6020.182-0015

Indicator	Unit	A1-A3	A4	A5	B2	B6	C2	C3	D
PM	Disease incidence	5.39E-05	5.40E-06	2.27E-08	1.89E-06	1.97E-05	1.15E-06	5.92E-08	3.65E-06
IR	kBq U235 eq.	3.39E+02	9.17E-01	4.57E-02	1.39E+00	6.05E+02	1.95E-01	1.53E-01	2.55E-01
ETP-fw	CTUe	1.25E+04	1.92E+02	1.12E+00	3.60E+02	3.91E+03	4.10E+01	4.68E+00	4.72E+03
HTP-c	CTUh	9.25E-06	3.66E-07	1.60E-09	2.04E-07	2.24E-06	7.80E-08	2.86E-09	1.89E-05
HTP-nc	CTUh	4.02E-05	5.81E-07	3.50E-09	6.22E-07	1.66E-05	1.24E-07	3.60E-08	1.47E-07
SQP	dimensionless	5.57E+03	4.25E+02	2.04E+00	1.14E+02	4.87E+03	9.05E+01	4.66E+00	2.87E+01

PM = Potential incidence of disease due to PM emissions; IR = Potential human exposure efficiency relative to U-235; 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 (non-carcinogenic); SQP = Potential soil quality index

Table 17. Inventory Metrics – 6020.182-0015

Indicator	Unit	A1-A3	A4	A5	B2	B6	C2	C3	D
PERE	MJ, net calorific value	1.12E+03	1.21E+01	4.66E-01	4.38E+01	6.00E+03	2.58E+00	2.00E+00	-9.67E+00
PERM	MJ, net calorific value	1.40E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ, net calorific value	1.26E+03	1.21E+01	4.66E-01	4.38E+01	6.00E+03	2.58E+00	2.00E+00	-9.67E+00
PENRE	MJ, net calorific value	9.08E+03	7.19E+02	4.37E+00	1.72E+02	2.19E+04	1.53E+02	1.51E+01	5.61E+02
PENRM	MJ, net calorific value	4.52E+02	0.00E+00	0.00E+00	3.47E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ, net calorific value	9.53E+03	7.19E+02	4.37E+00	1.75E+02	2.19E+04	1.53E+02	1.51E+01	5.61E+02
SM	kg	3.46E+01	3.27E-01	1.54E-03	7.62E-01	3.62E+00	6.97E-02	4.04E-03	3.81E-02
RSF	MJ, net calorific value	4.49E+00	4.13E-03	1.83E-05	5.62E-03	2.89E-02	8.79E-04	6.60E-04	2.01E-03
NRSF	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m3	5.92E+00	9.81E-02	1.56E-03	2.60E-01	1.90E+01	2.09E-02	7.51E-03	-1.72E-01

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

Table 18. Output flows and Waste Category Indicators – 6020.182-0015

Indicator	Unit	A1-A3	A4	A5	B2	B6	C2	C3	D
HWD	kg	9.70E+01	1.03E+00	7.93E-03	7.05E+00	5.54E+01	2.19E-01	1.08E-01	4.44E+00
NHWD	kg	2.52E+03	2.17E+01	5.78E-01	1.36E+02	4.29E+03	4.63E+00	2.63E+00	1.57E-02
RWD	kg	9.30E-02	2.28E-04	1.17E-05	3.67E-04	1.55E-01	4.86E-05	3.73E-05	5.38E-05
CRU	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
MFR	kg	1.02E+02	0.00E+00	0.00E+00	9.09E-01	0.00E+00	0.00E+00	9.69E+01	0.00E+00
MER	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
EEE	MJ	8.38E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	3.34E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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

5 LCA Interpretation

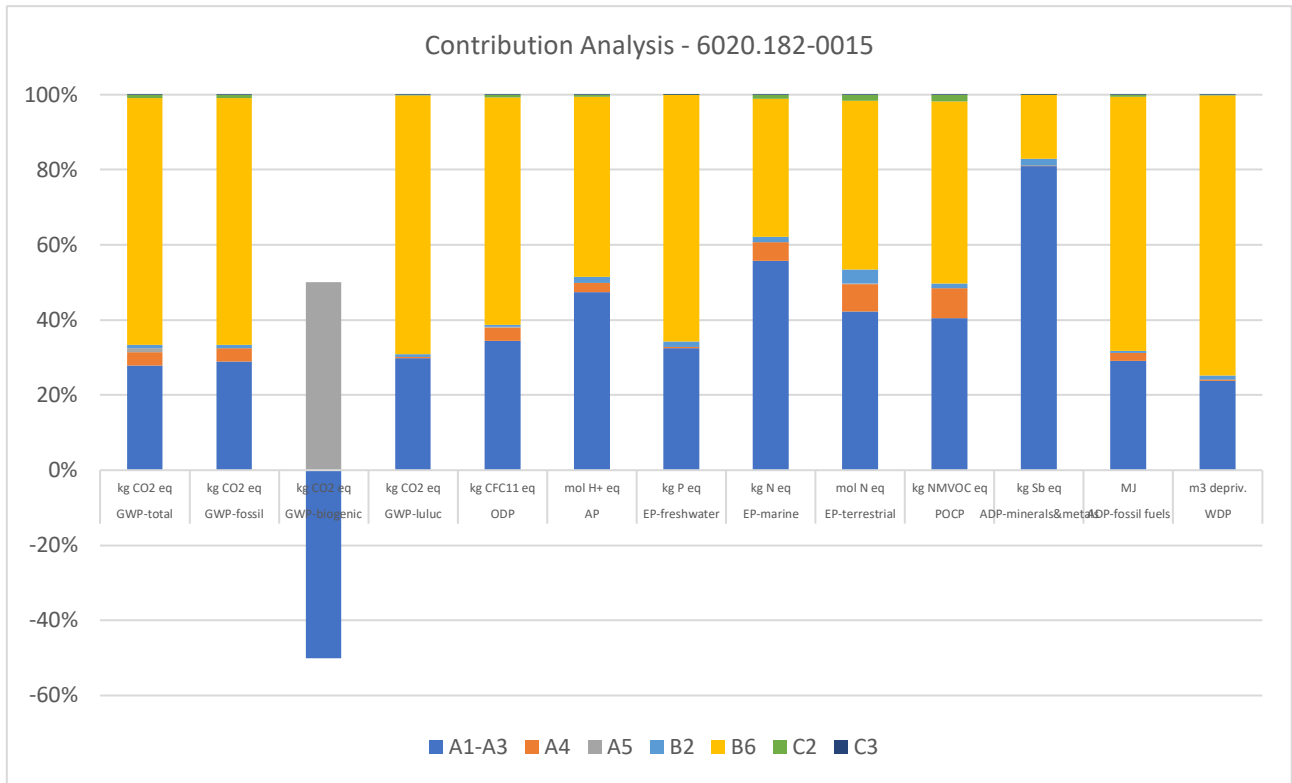


Figure 3: Contribution Analysis of 6020.182-0015, EN15804 + A2 Core impact results

Main life-cycle contributors:

- The cradle-to-gate stages (A1–A3) and operational energy use (B6) dominate all impact categories.
- Depending on the indicator, A1–A3 contribute 24–81%, primarily driven by materials.

Composition of A1–A3

- Raw materials account for ~90% of cradle-to-gate impacts, mainly due to aluminum, cast iron, steel components and various subassemblies.
- Manufacturing inputs contribute moderately, with ~70% of impact from consumption of grid electricity, followed by waste transportaion at about 9%.

Use-phase dominance (B6)

- B6 is declared per year as required by the PCR.
- When scaled to a 10-year Reference Service Life, B6 becomes the largest contributor across most indicators, representing up to 96% of total impacts (except Resource use – minerals and metals, at ~76%).

Improvement considerations

- Further increase energy-efficiency performance through motor and control optimization.
- Explore recycled metal content in other components like aluminum and steel where feasible.
- Continue reducing manufacturing electricity intensity, and waste associated with supplied components packaging.

6 Calculation Rules for Product Specific EPD Results

Life cycle inventory data (materials, packaging, LCIA indicators and other inventory metrics) were compiled for the six declared products. A parameterized LCA model is used to calculate product-specific results.

Because the six products are similar in material composition, manufacturing processes, and function, a single EPD will be developed to represent the full product group using a multiplication-factor approach. The complete environmental impacts will be calculated and reported for one representative product, 6020.182-0015. For the remaining products, the core environmental indicators will be reported as multiplication factors relative to the reference product.

To allow for product-specific contexts, life cycle module-specific multiplication factors are reported for each product. Impacts associated with the declared unit are calculated based on the following formula.

$$\text{Impact per product} = \Sigma (\text{Representative product module result} \times \text{Module multiplication factor})$$

Module-specific multiplication factors for all declared variants are provided in Table 19.

6.1 Multiplication Factors

This section presents the multiplication factors of the core environmental impact indicators for the other products derived from comparison with the representative product (6020.182-0015). The multiplication factors will be used to communicate product-specific life cycle impacts.

For each indicator result of a particular product, multiply the module-specific multiplication factor by the corresponding module result of the representative product.

Table 19. Core Environmental Impact Indicators – Multiplication Factors

Indicator	Unit	Product	A1-A3	A4	A5	B2	B6	C2	C3	D	
GWP-total	kg CO2 eq	6020.182-0011	1.02	1.11	1.64	1.00	3.25	1.06	1.00	1.08	
		6020.182-0012	1.08	1.20	1.64	1.00	2.45	1.16	1.00	1.20	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		6020.182-0021	1.25	0.88	1.00	1.00	1.00	1.00	0.87	1.17	0.75
		6020.182-0075	1.21	0.85	1.00	1.00	1.00	1.00	0.84	1.03	0.72
GWP-fossil	kg CO2 eq	6020.182-0011	1.04	1.11	1.47	1.00	3.25	1.06	1.00	1.09	
		6020.182-0012	1.10	1.20	1.47	1.00	2.45	1.16	1.00	1.23	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		6020.182-0021	1.24	0.88	1.00	1.00	1.00	1.00	0.87	1.17	0.68
		6020.182-0075	1.21	0.85	1.00	1.00	1.00	1.00	0.84	1.03	0.70
GWP-biogenic	kg CO2 eq	6020.182-0011	1.65	0.00	1.65	0.00	0.00	0.00	0.00	0.00	
		6020.182-0012	1.65	0.00	1.65	0.00	0.00	0.00	0.00	0.00	
		6020.182-0145	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0021	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0075	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
GWP-luluc	kg CO2 eq	6020.182-0011	1.15	1.11	1.16	1.00	3.25	1.06	1.00	0.96	
		6020.182-0012	1.21	1.20	1.16	1.00	2.45	1.16	1.00	0.93	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		6020.182-0021	1.21	0.88	1.00	1.00	1.00	1.00	0.87	1.17	-0.76
		6020.182-0075	1.19	0.85	1.00	1.00	1.00	1.00	0.84	1.03	-1.18
ODP	kg CFC11 eq	6020.182-0011	1.04	1.11	1.48	1.00	3.25	1.06	1.00	1.11	
		6020.182-0012	1.08	1.20	1.48	1.00	2.45	1.16	1.00	1.28	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		6020.182-0021	1.01	0.88	1.00	1.00	1.00	1.00	0.87	1.17	0.91

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Indicator	Unit	Product	A1-A3	A4	A5	B2	B6	C2	C3	D	
		6020.182-0075	0.95	0.85	1.00	1.00	1.00	0.84	1.03	0.97	
AP	mol H+ eq	6020.182-0011	1.02	1.11	1.46	1.00	3.25	1.06	1.00	1.15	
		6020.182-0012	1.05	1.20	1.46	1.00	2.45	1.16	1.00	1.37	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		6020.182-0021	0.99	0.88	1.00	1.00	1.00	1.00	0.87	1.17	0.68
		6020.182-0075	0.99	0.85	1.00	1.00	1.00	1.00	0.84	1.03	0.74
EP-freshwater	kg P eq	6020.182-0011	1.02	1.11	1.11	1.00	3.25	1.06	1.00	0.53	
		6020.182-0012	1.05	1.20	1.11	1.00	2.45	1.16	1.00	-0.02	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97
		6020.182-0021	0.90	0.88	1.00	1.00	1.00	1.00	0.87	1.17	2.06
		6020.182-0075	0.90	0.85	1.00	1.00	1.00	1.00	0.84	1.03	2.04
EP-marine	kg N eq	6020.182-0011	1.04	1.11	1.52	1.00	3.25	1.06	1.00	1.10	
		6020.182-0012	1.09	1.20	1.52	1.00	2.45	1.16	1.00	1.24	
		6020.182-0145	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		6020.182-0021	0.93	0.88	1.00	1.00	1.00	1.00	0.87	1.17	0.77
		6020.182-0075	0.93	0.85	1.00	1.00	1.00	1.00	0.84	1.03	0.67
EP-terrestrial	mol N eq	6020.182-0011	1.04	1.11	1.57	1.00	3.25	1.06	1.00	1.20	
		6020.182-0012	1.08	1.20	1.57	1.00	2.45	1.16	1.00	1.49	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.01
		6020.182-0021	1.07	0.88	1.00	1.00	1.00	1.00	0.87	1.17	0.37
		6020.182-0075	1.06	0.85	1.00	1.00	1.00	1.00	0.84	1.03	0.40
POCP	kg NMVOC eq	6020.182-0011	1.04	1.11	1.57	1.00	3.25	1.06	1.00	1.13	
		6020.182-0012	1.08	1.20	1.57	1.00	2.45	1.16	1.00	1.32	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		6020.182-0021	1.11	0.88	1.00	1.00	1.00	1.00	0.87	1.17	0.58
		6020.182-0075	1.07	0.85	1.00	1.00	1.00	1.00	0.84	1.03	0.60
ADP-minerals & metals	kg Sb eq	6020.182-0011	1.01	1.11	1.26	1.00	3.25	1.06	1.00	0.97	
		6020.182-0012	1.03	1.20	1.26	1.00	2.45	1.16	1.00	0.96	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99
		6020.182-0021	0.77	0.88	1.00	1.00	1.00	1.00	0.87	1.17	0.96
		6020.182-0075	0.77	0.85	1.00	1.00	1.00	1.00	0.84	1.03	0.96
ADP-fossil fuels	MJ	6020.182-0011	1.05	1.11	1.41	1.00	3.25	1.06	1.00	1.09	
		6020.182-0012	1.13	1.20	1.41	1.00	2.45	1.16	1.00	1.24	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		6020.182-0021	1.05	0.88	1.00	1.00	1.00	1.00	0.87	1.17	0.67
		6020.182-0075	0.99	0.85	1.00	1.00	1.00	1.00	0.84	1.03	0.69
WDP	m3 depriv.	6020.182-0011	1.04	1.11	1.13	1.00	3.25	1.06	1.00	0.90	
		6020.182-0012	1.10	1.20	1.13	1.00	2.45	1.16	1.00	0.81	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99
		6020.182-0021	1.06	0.88	1.00	1.00	1.00	1.00	0.87	1.17	0.56
		6020.182-0075	1.02	0.85	1.00	1.00	1.00	1.00	0.84	1.03	0.29

GWP = Global warming potential; luluc = Land use and land use change; 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; ADP-minerals & metals = Abiotic depletion potential for non-fossil resources; ADP-fossil fuels = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

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Table 20. Additional Environmental Impact Indicators – Multiplication Factors

Indicator	Unit	Product	A1-A3	A4	A5	B2	B6	C2	C3	D	
PM	Disease incidence	6020.182-0011	1.06	1.11	1.59	1.00	3.25	1.06	1.00	1.10	
		6020.182-0012	1.15	1.20	1.59	1.00	2.45	1.16	1.00	1.25	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		6020.182-0021	0.94	0.88	1.00	1.00	1.00	0.87	1.17	0.66	
		6020.182-0075	0.94	0.85	1.00	1.00	1.00	0.84	1.03	0.68	
IR	kBq U235 eq.	6020.182-0011	1.06	1.11	1.05	1.00	3.25	1.06	1.00	1.40	
		6020.182-0012	1.15	1.20	1.05	1.00	2.45	1.16	1.00	1.87	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.01	
		6020.182-0021	0.85	0.88	1.00	1.00	1.00	0.87	1.17	2.89	
		6020.182-0075	0.83	0.85	1.00	1.00	1.00	0.84	1.03	3.47	
ETP-fw	CTUe	6020.182-0011	1.03	1.11	1.44	1.00	3.25	1.06	1.00	1.09	
		6020.182-0012	1.08	1.20	1.44	1.00	2.45	1.16	1.00	1.23	
		6020.182-0145	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
		6020.182-0021	0.84	0.88	1.00	1.00	1.00	0.87	1.17	0.56	
		6020.182-0075	0.84	0.85	1.00	1.00	1.00	0.84	1.03	0.55	
HTP-c	CTUh	6020.182-0011	1.07	1.11	1.57	1.00	3.25	1.06	1.00	1.08	
		6020.182-0012	1.18	1.20	1.57	1.00	2.45	1.16	1.00	1.21	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
		6020.182-0021	0.72	0.88	1.00	1.00	1.00	0.87	1.17	0.57	
		6020.182-0075	0.74	0.85	1.00	1.00	1.00	0.84	1.03	0.57	
HTP-nc	CTUh	6020.182-0011	1.01	1.11	1.41	1.00	3.25	1.06	1.00	1.52	
		6020.182-0012	1.02	1.20	1.41	1.00	2.45	1.16	1.00	2.11	
	SQP	6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	
		6020.182-0021	0.81	0.88	1.00	1.00	1.00	0.87	1.17	0.23	
		6020.182-0075	0.82	0.85	1.00	1.00	1.00	0.84	1.03	0.17	
SQP	dimensionless	6020.182-0011	1.13	1.11	1.52	1.00	3.25	1.06	1.00	1.72	
		6020.182-0012	1.18	1.20	1.52	1.00	2.45	1.16	1.00	2.61	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	
		6020.182-0021	0.92	0.88	1.00	1.00	1.00	0.87	1.17	-0.70	
		6020.182-0075	0.90	0.85	1.00	1.00	1.00	0.84	1.03	-0.73	

PM = Potential incidence of disease due to PM emissions; IR = Potential human exposure efficiency relative to U-235; 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 (non-carcinogenic); SQP = Potential soil quality index

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Table 21. Inventory Metrics – Multiplication Factors

Indicator	Unit	Product	A1-A3	A4	A5	B2	B6	C2	C3	D	
PERE	MJ, net calorific value	6020.182-0011	1.05	1.11	1.06	1.00	3.25	1.06	1.00	0.81	
		6020.182-0012	1.12	1.20	1.06	1.00	2.45	1.16	1.00	0.60	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99
		6020.182-0021	1.01	0.88	1.00	1.00	1.00	1.00	0.87	1.17	-1.09
		6020.182-0075	1.00	0.85	1.00	1.00	1.00	1.00	0.84	1.03	-1.64
PERM	MJ, net calorific value	6020.182-0011	1.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0012	1.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0145	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0021	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0075	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERT	MJ, net calorific value	6020.182-0011	1.12	1.11	1.06	1.00	3.25	1.06	1.00	0.81	
		6020.182-0012	1.18	1.20	1.06	1.00	2.45	1.16	1.00	0.60	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99
		6020.182-0021	1.01	0.88	1.00	1.00	1.00	1.00	0.87	1.17	-1.09
		6020.182-0075	1.00	0.85	1.00	1.00	1.00	1.00	0.84	1.03	-1.64
PENRE	MJ, net calorific value	6020.182-0011	1.05	1.11	1.41	1.00	3.25	1.06	1.00	1.09	
		6020.182-0012	1.13	1.20	1.41	1.00	2.45	1.16	1.00	1.24	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		6020.182-0021	1.03	0.88	1.00	1.00	1.00	1.00	0.87	1.17	0.67
		6020.182-0075	0.99	0.85	1.00	1.00	1.00	1.00	0.84	1.03	0.69
PENRM	MJ, net calorific value	6020.182-0011	1.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0012	1.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0145	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0021	1.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0075	0.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ, net calorific value	6020.182-0011	1.05	1.11	1.41	1.00	3.25	1.06	1.00	1.09	
		6020.182-0012	1.13	1.20	1.41	1.00	2.45	1.16	1.00	1.24	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		6020.182-0021	1.04	0.88	1.00	1.00	1.00	1.00	0.87	1.17	0.67
		6020.182-0075	0.98	0.85	1.00	1.00	1.00	1.00	0.84	1.03	0.69
SM	kg	6020.182-0011	1.13	1.11	1.53	1.00	3.25	1.06	1.00	1.30	
		6020.182-0012	1.17	1.20	1.53	1.00	2.45	1.16	1.00	1.66	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.01
		6020.182-0021	1.00	0.88	1.00	1.00	1.00	1.00	0.87	1.17	0.61
		6020.182-0075	1.04	0.85	1.00	1.00	1.00	1.00	0.84	1.03	0.67
RSF	MJ, net calorific value	6020.182-0011	1.43	1.11	1.56	1.00	3.25	1.06	1.00	1.12	
		6020.182-0012	1.46	1.20	1.56	1.00	2.45	1.16	1.00	1.29	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		6020.182-0021	0.98	0.88	1.00	1.00	1.00	1.00	0.87	1.17	0.81
		6020.182-0075	0.94	0.85	1.00	1.00	1.00	1.00	0.84	1.03	0.84
NRSF	MJ, net calorific value	6020.182-0011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0012	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Indicator	Unit	Product	A1-A3	A4	A5	B2	B6	C2	C3	D	
		6020.182-0075	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
FW	m3	6020.182-0011	1.04	1.11	1.13	1.00	3.25	1.06	1.00	0.90	
		6020.182-0012	1.10	1.20	1.13	1.00	2.45	1.16	1.00	0.81	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99
		6020.182-0021	1.06	0.88	1.00	1.00	1.00	0.87	1.17	1.00	0.52
		6020.182-0075	1.03	0.85	1.00	1.00	1.00	0.84	1.03	1.00	0.24

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

Table 22. Output flows and Waste Category Indicators – Multiplication Factors

Indicator	Unit	Product	A1-A3	A4	A5	B2	B6	C2	C3	D	
HWD	kg	6020.182-0011	1.03	1.11	1.32	1.00	3.25	1.06	1.00	1.11	
		6020.182-0012	1.09	1.20	1.32	1.00	2.45	1.16	1.00	1.29	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
		6020.182-0021	1.12	0.88	1.00	1.00	1.00	0.87	1.17	1.00	0.81
		6020.182-0075	1.21	0.85	1.00	1.00	1.00	0.84	1.03	1.00	0.88
NHWD	kg	6020.182-0011	1.02	1.11	1.19	1.00	3.25	1.06	1.00	1104.41	
		6020.182-0012	1.06	1.20	1.19	1.00	2.45	1.16	1.00	2315.74	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	75.41
		6020.182-0021	0.97	0.88	1.00	1.00	1.00	0.87	1.17	1.00	-1173.82
		6020.182-0075	0.96	0.85	1.00	1.00	1.00	0.84	1.03	1.00	-2485.89
RWD	kg	6020.182-0011	1.05	1.11	1.05	1.00	3.25	1.06	1.00	1.48	
		6020.182-0012	1.14	1.20	1.05	1.00	2.45	1.16	1.00	2.03	
		6020.182-0145	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02
		6020.182-0021	0.84	0.88	1.00	1.00	1.00	0.87	1.17	1.00	3.37
		6020.182-0075	0.82	0.85	1.00	1.00	1.00	0.84	1.03	1.00	4.07
CRU	kg	6020.182-0011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		6020.182-0012	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0075	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MFR	kg	6020.182-0011	1.06	0.00	0.00	1.00	0.00	0.00	1.06	0.00	
		6020.182-0012	1.17	0.00	0.00	1.00	0.00	0.00	1.17	0.00	
		6020.182-0145	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	
		6020.182-0021	0.83	0.00	0.00	1.00	0.00	0.00	0.84	0.00	
		6020.182-0075	0.80	0.00	0.00	1.00	0.00	0.00	0.85	0.00	
MER	kg	6020.182-0011	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		6020.182-0012	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		6020.182-0145	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		6020.182-0021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		6020.182-0075	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
EEE	MJ	6020.182-0011	1.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
		6020.182-0012	1.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

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Indicator	Unit	Product	A1-A3	A4	A5	B2	B6	C2	C3	D
		6020.182-0145	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0021	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0075	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EET	MJ	6020.182-0011	1.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0012	1.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0145	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0021	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		6020.182-0075	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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

7 Additional Environmental Information

7.1 Environment and Health During Manufacturing and Installation

No substances required to be reported as hazardous are associated with the production of the products.

7.2 Environment and Health During Use

The products do not release any dangerous, regulated substances that affect health and the environment according to the relevant market of applicability.

7.3 Disclaimer

This EPD is intended for business-to-business (B2B) communication. It reflects average conditions at Xylem's Emmaboda facility for 2024. Comparisons with other EPDs are only valid when based on the same PCR and system boundaries.

PCR Part A	Institut Bauen und Umwelt e.V. (IBU). (2024). Product Category Rules for Building-Related Products and Services. Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019 (Version 1.4).
PCR Part B	Institut Bauen und Umwelt e.V. (IBU). (2024). PCR Guidance-Texts for Building-Related Products and Services. Part B: Requirements on the EPD for Pumps for liquids and liquids with solids (v11).
EN 15804	DS/EN 15804:2021+A2:2019 (2021). Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.
ISO 14025	ISO. (2006). ISO 14025:2006: Environmental labels and declarations – Type III environmental declarations – Principles and procedures. International Organization for Standardization.
ISO 14044	ISO. (2006). ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines. International organization for Standardization (ISO).
ISO 14040	ISO. (2006). ISO14040:2006/Amd 1:2020 – Environmental management – Life cycle assessment – Principles and framework. International Organization for Standardization.
ISO 14046	ISO. (2014). ISO 14046:2014 Environmental management - Water footprint - Principles, requirements and guidelines.
ISO 9906	ISO 9906:2012. Rotodynamic pumps – Hydraulic performance acceptance tests – Grades 1, 2 and 3.
EU 547/2012	Ecodesign Pump Review: Study of Commission Regulation (EU) No. 547/2012 (Ecodesign requirements for water pumps).
Ecoinvent	Weidema B P, B. C. (2013). Overview and methodology. Data quality guideline for the ecoinvent database version 3. St. Gallen: The ecoinvent Centre.

Much of the data utilized for this Environmental Product Declaration/LCA Report is based on information supplied by the manufacturer. TrueNorth Collective is not responsible for the accuracy, completeness, or reliability of the data provided by the manufacturer or any information or conclusions derived therefrom.

7.4 Limitations

Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc.

Accuracy of Results: EPDs regularly rely on estimations of impacts; the level of accuracy in estimation of effect differs for any particular product line and reported impact.

Comparability: EPDs from different programs may not be comparable. Full conformance with a PCR allows EPD comparability only 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.