

ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Frese Flow and Pressure Control Valves

Vexve Denmark | Frese A/S



EPD HUB, HUB-5534

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Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.2 (24 Mar 2025) and JRC characterization factors EF 3.1.

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Vexve Denmark | Frese A/S
Address	Sorøvej 8, DK-4200 Slagelse
Contact details	dk.info@vexve.com
Website	www.frese.eu, www.vexve.com

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804:2012+A2:2019/AC:2021 and ISO 14025
PCR	EPD Hub Core PCR Version 1.2, 24 Mar 2025
Sector	Manufactured product
Category of EPD	Third party verified EPD
Parent EPD number	-
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Anne Damm, Vexve Denmark | Frese A/S
EPD verification	Independent verification of this EPD and data, according to ISO 14025: Internal verification External verification
EPD verifier	Sarah Curpen as an authorized verifier for EPD Hub

This EPD is intended for business-to-business and/or business-to-consumer communication. The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	Frese Flow and Pressure Control Valves
Additional labels	This EPD covers: (OPTIMA Compact DN10 - DN 50), (OPTIMA Compact Veriflow-series DN10 - DN50), (SIGMA Compact-series DN15 - DN50), (PV Compact-series DN15 - DN50, PV-SIGMA), (Compact and PV-SIGMA Compact Spectrum-series), (Frese DPRV (Differential pressure relief valve)), (Frese STBV FODRV Range DN15-DN50), (Frese STBV VODRV DN15-DN50), (PV Compact Spectrum-series DN15-DN50), (Frese COMBIFLOW 6-way), (Frese OPTIMIZER 6-way) and (All Frese Bypass unit MODULA types)
Product reference	Reference product is: SIGMA Compact DN15 F/F Low P/T (53-2202)
Place(s) of raw material origin	Asia and Europe
Place of production	Denmark, Slagelse
Place(s) of installation and use	Global
Period for data	Calendar year 2024
Averaging in EPD	Multiple products and multiple factories
Variation in GWP-fossil for A1-A3 (%)	-10% |-7,4% |+42%
GTIN (Global Trade Item Number)	5705564052001
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	11,4

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg
Declared unit mass	1 kg
Mass of packaging	0,15817 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	7,09
GWP-total, A1-A3 ($kgCO_2e$)	6,98
Secondary material, inputs (%)	7,35
Secondary material, outputs (%)	55
Total energy use, A1-A3 (kWh)	22,1
Net freshwater use, A1-A3 (m^3)	0,13

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Vexve – Inspired by Your Flow

Vexve aims to be the leading provider of mission-critical valve solutions in the transition to a low-carbon future.

At Vexve Denmark, we develop and manufacture dynamic valves and innovative, energy-efficient solutions for hydronic systems in buildings and industrial applications, marine systems and district energy networks. Our technologies optimise energy use and enhance overall system performance.

With more than 80 years of experience under the Frese name, we are proud to be part of the Vexve Group. Together, we work to become the leading provider of mission-critical valve technologies in the shift towards a lower-carbon future.

We supply more than 70 countries and employ over 900 people across modern production facilities in Finland, the Czech Republic, Germany, China and Denmark.

Our mission is to advance energy efficiency – through deep technical expertise, reliable partnerships and solutions that make a real difference.

PRODUCT DESCRIPTION

Product description:

The Frese control and balancing valve range is a family of hydronic products that keep water-based heating and cooling systems stable, energy efficient and easy to operate in all types of applications. The group includes pressure independent control valves, 6-way PICVs for change-over applications, prefabricated bypass units, dynamic flow limiting valves, differential pressure control valves and manual balancing valves. Together, they regulate flow, keep differential pressure within a defined range and allow accurate balancing of branches and terminal units, so that every coil, fan coil or air handling unit receives exactly the flow it needs under changing load conditions.

The products are designed for closed water and water/glycol HVAC systems and are installed in risers, branches and at terminals in both constant and variable flow networks. Pressure independent control valves combine control and automatic flow limitation in one body and can be equipped with electronic actuators for room or building management system control. 6-way PICVs provide heating and cooling changeover control to one terminal unit using a single valve and actuator, reducing component count and simplifying pipework. Bypass units integrate isolating valves, measuring points and connections for PICVs or flow limiting valves in compact assemblies to speed up installation and commissioning.

Dynamic flow limiting valves and differential pressure control valves stabilize the hydraulic conditions in zones and branches, while manual balancing valves and metering stations are used for fine tuning and documentation of flows during commissioning and service. The valves are mainly metallic bodies with elastomer and polymer sealing elements and, for motorized versions, electronic actuators with housing in metal and plastic. In this EPD the entire group is treated as one product family representing typical material composition, function and service conditions for modern hydronic control and balancing valves. The environmental impacts of the actuator itself are not included in this EPD.

Product application:

Find the “Application Guide” on the frontpage on our website: www.frese.eu.

Technical Characteristics:

Dimension: DN15-DN50

Pressure class: PN16 and PN25

Product standards:

Find “Certificates and Declarations of Conformity on our website, under “Technical info” @ www.frese.eu.

Physical properties of the product:

The valves in this group primarily consist of Brass which ranges from 85% - 95%. Other parts of the valves consist of rubber parts made of EPDM or HNBR and plastic parts made of generic components such as ABS, PPS, PA6 and SEPS.

Further information can be found at: www.frese.eu **and** www.vexve.com

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	91,12%	Asia and Europe
Minerals	0	-
Fossil materials	8,88%	Asia and Europe
Bio-based materials	0	-

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate.

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0,063

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 kg
Mass per declared unit	1 kg
Functional unit	-
Reference service life	-

SUBSTANCES, REACH - VERY HIGH CONCERN

Substances of very high concern	EC	CAS
Lead: The brass used for the valves contains lead. For every 1 kg of brass, approximately 2% (0.02 kg) is lead.	231-100-4	7439-92-1

Where applicable, the articles covered by this EPD that contain SVHC above 0,1% (w/w) are registered in the ECHA SCIP database. SCIP numbers are available on our website www.frese.eu.

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
x	x	x	x	x	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Not declared = ND.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

The valve consists of an average of 90% brass. Other materials include stainless steel, various plastics (SEPS, PPS, PA6, ABS), and rubber components (HNBR, EPDM).

The manufacturing process includes brass extrusion and machining. Metal scrap (brass and stainless steel) generated during production is sent directly from the factory to authorized recycling facilities. Plastic and rubber waste is either incinerated for energy recovery or landfilled. Additional manufacturing steps include product testing and packaging. Electricity is consumed during machining operations and for electric forklifts. Heating is delivered by District heating. A location-based approach is used in modelling the electricity mix utilized in the factory. Oils and silicone grease are used for lubrication and cooling during metalworking. Pneumatic air and water are used for pressure testing and cleaning of newly machined valve housings.

Transport data is based on actual distances between each component supplier and the factory. Production losses and manufacturing waste consist of metal scrap from brass and steel processing. This scrap is sent to authorized recycling facilities, with transport distances defined as the distance between the manufacturing site and the recycling recipient.

Packaging materials include wooden EUR pallets, cardboard boxes, and plastic film. Ancillary materials used in production include cutting fluid and water. Wastewater is collected by a waste management company due to contamination with oil. Oil is mixed with water and remains on metal shavings and parts that are washed.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

The transport distance from manufacturer to the installation site is calculated as an average of all kilometers traveled to deliver the valves to customers during 2024. The calculation relies on relative annual sales percentages combined with actual distances in kilometers.
The scope of sales in 2024 was global, and the chosen transport method was lorries. We assume full truckloads, meaning the vehicle capacity utilization factor is set to one. Yes, it can vary, but since transportation emissions only play a minor role in the overall environmental impact, those variations are considered negligible. Nothing gets lost during transport because the packaging is secure, and even nested packaging assumes full volume utilization.

The installation process is normally carried out using hand tools or handheld equipment with minimal energy use, therefore the resources required for A5 installation are considered negligible in this assessment.

During installation waste is generated from packaging, and it falls into four material types: cardboard, paper, plastic, and wood. According to EUROSTAT cardboard, paper and plastic are mostly recycled, while wooden pallets are mostly landfilled (but typically reused).

PRODUCT USE AND MAINTENANCE (B1-B7)

The life expectancy for our valves is approximately 15 years, with a warranty period of 5 years.

Frese Flow and Pressure Control Valves do not need maintenance, repair or refurbishment. The use phase is not relevant for the life cycle emissions of this product and is therefore not accounted for in the assessment.

Air, soil, and water impacts during the use phase have not been studied.

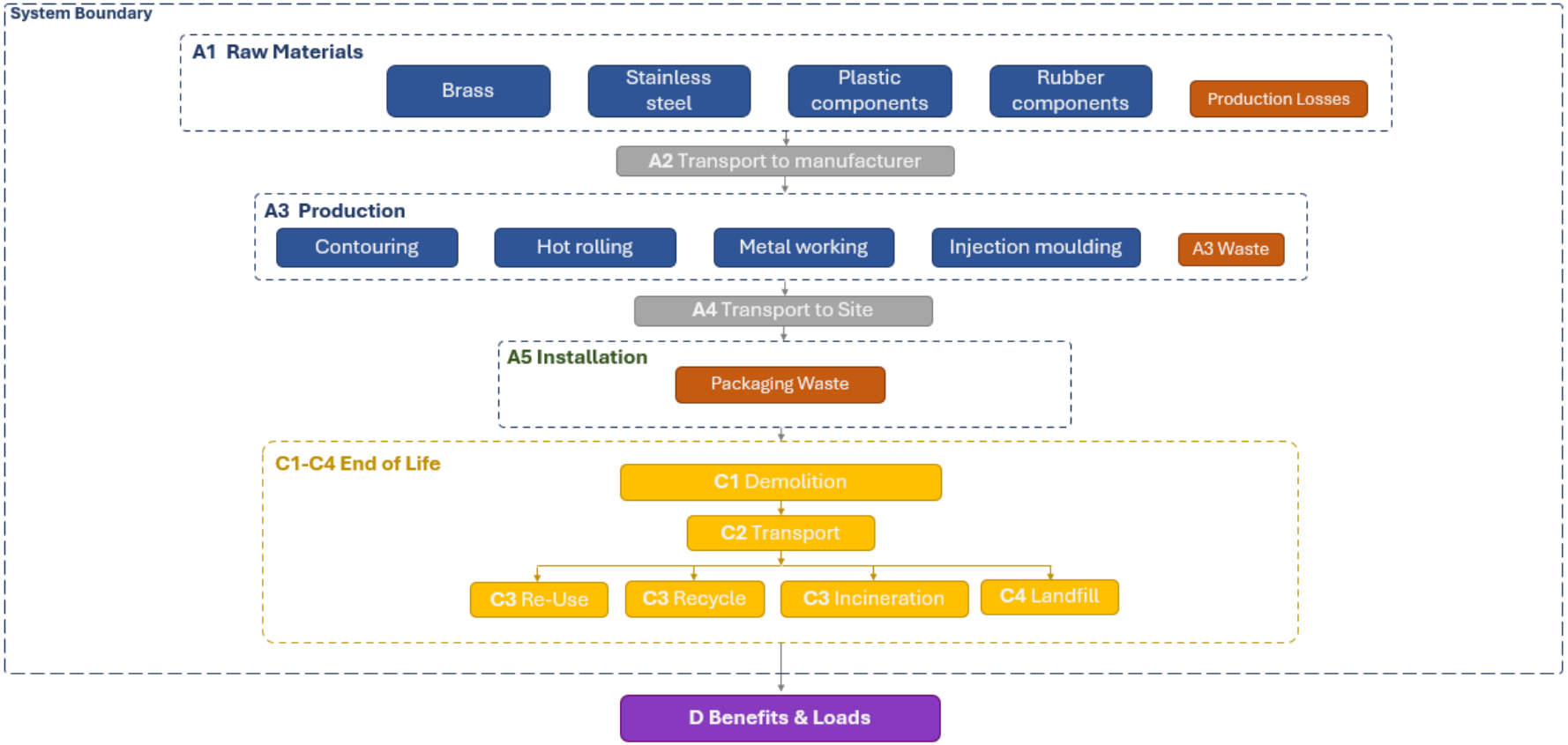
PRODUCT END OF LIFE (C1-C4, D)

Disassembly is typically done with hand tools or handheld equipment, using so little energy that the resources needed for this step (C1) are considered negligible in the assessment. At the end of life, the product is assumed to be sent to the nearest waste handling site, with an estimated transportation distance of 20 km (C2).

In module C3 energy and resource are used for sorting and processing brass, stainless steel, rubber, plastics, and composite materials for recycling and incineration with energy recovery at an efficiency greater than 60%. Waste that is incinerated without energy recovery or landfilled is included in module C4. 95% of steel is recycled, while 60% of brass is recycled; the remaining 5% steel and 40% brass, respectively, are landfilled according to internationalcopper.org. 73% of rubber and plastic component waste is incinerated with energy recovery, and 27% is landfilled according to plasticseurope.org.

Due to the material and energy recovery potential of parts in the product and its packaging, recycled raw materials lead to avoided virgin material production. Additionally, energy recovered from incineration of waste replaces electricity and heat that would otherwise come from primary sources. Benefits and loads from incineration and recycling in module C are included in module D. The benefits and loads of waste packaging in A5 and waste packaging in A3 are also included in module D.

SYSTEM DIAGRAM



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

This LCA study includes the provision of all materials, transportation, energy and emission flows, and end of life processing of the product. All industrial processes from raw material acquisition and pre-processing, production, product distribution and installation and end-of-life management are included.

VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No Allocation
Packaging material	Allocated by mass or volume
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	Multiple products and multiple factories
Grouping method	Based on a representative product
Variation in GWP-fossil for A1-A3, %	-10% |-7,4% |+42%

Frese Flow and Pressure Control Valve, SIGMA Compact F/F DN15 Low P/T 53-2202, has been selected as the representative valve. It has been chosen because it's one of the best-selling valves and is closest to the general average mass of the group. Most of the material and components that 53-2202 comprise of are the same for the other products in this group.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator for EPD Hub V3 and EPD System Verification v3.2.3. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1/3.11 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1/3.11 environmental data sources follow the methodology 'allocation, Cut-off, EN 15804+A2'.

Additionally, the EPD Generator also uses ProBas as a source of environmental data. ProBas is a life cycle inventory database developed by the German Environment Agency (UBA) and provides detailed LCI data for materials and processes. The database supports life cycle assessment in accordance with ISO 14040 and ISO 14044.

References for installation waste (A5) are taken from EUROSTAT [env_waspac] - Eurostat *"Packaging waste by waste management operations"* (2021).

End-of-Life recycling rate references are sourced from:

Worldstainless.org Recycling - worldstainless *"The global life cycle of stainless steels"* (2019) reporting that 95% of stainless steel is recycled.

Internationalcopper.org Recycling - copperalliance *"Copper recycling"* (2016) reporting that approximately 60% of copper alloys, such as brass are recycled.

Plasticseurope.org Building & construction - Plastics Europe *"Overview of Plastic Waste from Building and Construction by Polymer and by Recycling, Energy Recovery and Disposal"* (2018) reporting that approximately 73% of plastic and rubber waste is treated via incineration with energy recovery.

ENVIRONMENTAL IMPACT DATA

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	6,22E+00	5,41E-01	2,14E-01	6,98E+00	8,82E-02	2,43E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,14E-03	2,20E-01	4,51E-03	-2,46E+00
GWP – fossil	kg CO_2e	6,11E+00	5,41E-01	4,41E-01	7,09E+00	8,82E-02	5,59E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,14E-03	2,20E-01	4,51E-03	-2,43E+00
GWP – biogenic	kg CO_2e	9,05E-02	1,11E-04	-2,29E-01	-1,38E-01	1,85E-05	2,38E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,51E-07	-4,59E-05	-2,25E-06	-2,63E-02
GWP – LULUC	kg CO_2e	2,57E-02	2,07E-04	1,48E-03	2,74E-02	3,33E-05	4,46E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,05E-07	1,85E-05	1,47E-06	-6,19E-03
Ozone depletion pot.	kg CFC_{-11}e	2,19E-07	1,07E-08	9,80E-09	2,39E-07	1,77E-09	4,49E-11	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,31E-11	2,23E-10	7,22E-11	-2,62E-08
Acidification potential	mol H^+e	2,29E-01	2,36E-03	1,94E-03	2,33E-01	3,19E-04	2,19E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,91E-06	1,88E-04	1,80E-05	-2,14E-01
EP-freshwater[2)]	kg Pe	8,63E-03	3,57E-05	2,62E-04	8,92E-03	5,90E-06	1,25E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,44E-07	8,62E-06	2,15E-07	-1,70E-02
EP-marine	kg Ne	1,47E-02	7,39E-04	5,16E-04	1,59E-02	1,05E-04	3,42E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,35E-06	4,68E-05	5,70E-05	-1,07E-02
EP-terrestrial	mol Ne	2,00E-01	8,07E-03	5,43E-03	2,13E-01	1,14E-03	7,69E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,56E-05	5,23E-04	7,46E-05	-1,51E-01
POCP ("smog")[3)]	kg NMVOCe	6,06E-02	3,24E-03	1,55E-03	6,54E-02	4,86E-04	2,65E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,13E-05	1,50E-04	2,71E-05	-4,20E-02
ADP-minerals & metals[4)]	kg Sbe	1,32E-03	1,45E-06	5,35E-06	1,33E-03	2,41E-07	2,56E-08	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,92E-09	8,95E-07	4,20E-09	-3,01E-03
ADP-fossil resources	MJ	5,44E+01	7,79E+00	6,00E+00	6,82E+01	1,27E+00	4,42E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,10E-02	2,06E-01	6,13E-02	-3,23E+01
Water use[5)]	m^3e depr.	2,21E+00	3,92E-02	3,34E-01	2,58E+00	6,49E-03	1,60E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,59E-04	1,35E-02	1,91E-04	-2,39E+00

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	1,05E-06	5,22E-08	1,63E-08	1,12E-06	8,68E-09	3,00E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,13E-10	2,37E-09	4,07E-10	-4,39E-07
Ionizing radiation[6]	kBq U235e	4,31E-01	9,16E-03	7,48E-02	5,15E-01	1,52E-03	2,74E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,74E-05	7,63E-04	4,12E-05	-3,45E-01
Ecotoxicity (freshwater)	CTUe	1,04E+03	9,06E-01	1,57E+01	1,05E+03	1,50E-01	1,29E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,66E-03	4,41E-01	8,86E-02	-3,03E+02
Human toxicity, cancer	CTUh	4,59E-07	9,02E-11	2,43E-10	4,60E-07	1,46E-11	3,48E-12	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,53E-13	1,43E-11	6,84E-13	-2,27E-08
Human tox. non-cancer	CTUh	1,95E-06	4,94E-09	6,27E-09	1,96E-06	8,21E-10	1,86E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,02E-11	8,23E-10	6,39E-11	-2,25E-06
SQP[7]	-	3,26E+03	7,58E+00	3,21E+01	3,30E+03	1,27E+00	4,22E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,13E-02	3,44E-01	1,23E-01	-7,01E+01

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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 nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8]	MJ	8,17E+00	1,24E-01	6,31E+00	1,46E+01	2,06E-02	-2,43E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,05E-04	2,92E-02	6,34E-04	-9,88E+00
Renew. PER as material	MJ	4,18E-04	0,00E+00	2,37E+00	2,37E+00	0,00E+00	-2,37E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	-3,05E-04	-1,13E-04	2,32E-01
Total use of renew. PER	MJ	8,17E+00	1,24E-01	8,68E+00	1,70E+01	2,06E-02	-4,80E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,05E-04	2,89E-02	5,21E-04	-9,65E+00
Non-re. PER as energy	MJ	5,18E+01	7,79E+00	5,32E+00	6,49E+01	1,27E+00	5,74E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,10E-02	-1,56E+00	-8,18E-01	-3,23E+01
Non-re. PER as material	MJ	2,64E+00	0,00E+00	1,18E-01	2,76E+00	0,00E+00	-1,18E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	-1,93E+00	-7,13E-01	1,64E-01
Total use of non-re. PER	MJ	5,44E+01	7,79E+00	5,44E+00	6,77E+01	1,27E+00	-1,12E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,10E-02	-3,49E+00	-1,53E+00	-3,22E+01
Secondary materials	kg	7,35E-02	3,38E-03	5,75E-03	8,26E-02	5,52E-04	6,80E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,34E-05	2,36E-04	1,61E-05	3,16E-01
Renew. secondary fuels	MJ	2,39E-03	4,12E-05	2,80E-02	3,04E-02	6,88E-06	4,10E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,69E-07	1,03E-05	3,28E-07	-7,38E-04
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	1,16E-01	1,13E-03	8,74E-03	1,26E-01	1,87E-04	-8,85E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,58E-06	2,74E-04	-3,21E-05	-1,02E-01

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	7,22E-01	1,12E-02	2,18E-02	7,55E-01	1,84E-03	7,38E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,49E-05	7,74E-03	7,19E-05	-8,66E-01
Non-hazardous waste	kg	3,88E+01	2,22E-01	1,52E+00	4,05E+01	3,67E-02	1,84E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,99E-04	1,13E-01	1,22E-01	-5,58E+01
Radioactive waste	kg	1,09E-04	2,27E-06	1,75E-05	1,29E-04	3,77E-07	6,97E-08	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,26E-09	1,90E-07	1,01E-08	-9,04E-05

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	1,60E-02	1,60E-02	0,00E+00	1,05E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	5,50E-01	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	1,51E-02	1,51E-02	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,30E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	6,50E-01	0,00E+00	0,00E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,40E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	2,75E-01	0,00E+00	0,00E+00
Exported energy –	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,55E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	3,75E-01	0,00E+00	0,00E+00

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	6,16E+00	5,38E-01	4,41E-01	7,13E+00	8,76E-02	1,72E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,13E-03	2,20E-01	4,39E-03	-2,43E+00
Ozone depletion Pot.	kg CFC_{-11}e	1,88E-07	8,55E-09	8,56E-09	2,05E-07	1,41E-09	3,69E-11	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,43E-11	1,86E-10	5,74E-11	-2,20E-08
Acidification	kg SO_2e	1,99E-01	1,82E-03	1,51E-03	2,02E-01	2,43E-04	1,65E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,24E-06	1,49E-04	1,33E-05	-1,88E-01
Eutrophication	kg PO_4^3e	1,01E-02	3,81E-04	1,10E-03	1,16E-02	5,71E-05	1,95E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,33E-06	2,40E-05	6,32E-06	-8,42E-03
POCP (“smog”)	kg C_2H_4e	8,51E-03	1,46E-04	1,24E-04	8,78E-03	2,15E-05	4,04E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,93E-07	8,97E-06	1,55E-06	-7,78E-03
ADP-elements	kg Sbe	1,32E-03	1,42E-06	5,27E-06	1,33E-03	2,35E-07	2,50E-08	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,78E-09	8,87E-07	4,11E-09	-3,01E-03
ADP-fossil	MJ	4,69E+01	7,63E+00	4,87E+00	5,94E+01	1,25E+00	3,95E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,04E-02	1,94E-01	6,07E-02	-2,72E+01

ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[9)]	kg CO_2e	6,13E+00	5,41E-01	4,43E-01	7,12E+00	8,82E-02	5,59E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,14E-03	2,20E-01	4,51E-03	-2,44E+00

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows – CH4 fossil, CH4 biogenic and Dinitrogen monoxide – were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterisation factor for biogenic CO2 is set to zero.

SCENARIO DUCOMENTATION

DATA SOURCES

Manufacturing energy scenario documentation

1. Market for electricity, low voltage, Denmark, Ecoinvent, 0.19 kgCO2e/kWh

2. Heat and power co-generation, natural gas, 1MW electrical, lean burn, Denmark, Ecoinvent, 0.0291 kgCO2e/MJ

Transport scenario documentation - A4 (Transport resources)

1. Transport, freight, lorry >32 metric ton, EURO5, 699,55 km

2. Transport, freight, sea, container ship, 109,45 km

Scenario parameter	Value
Capacity utilization (including empty return) %	• Lorry 50%
Bulk density of transported products (kg/m³)	0,000286 m³
Volume capacity utilization factor	• Lorry = 1

Installation scenario documentation - A5 (Installation waste)

Scenario information	Value	
Waste materials on the building site before waste processing, generated by the product's installation (specified by type) / kg	Wood packaging	0,05250
	Paper/Cardboard packaging	0,10472
	Plastic packaging	0,00095

Output materials (**specified by type**) as result of waste processing at the building site e.g. collection for recycling, for energy recovery, disposal (**specified by route**) / kg		Wood packaging	Paper / Cardboard	Plastic packaging
	Recycling	0,01680	0,08691	0,00038
	Energy recovery	0,01575	0,00838	0,00035
	Disposal	0,01995	0,00943	0,00022

End-of-Life scenario documentation - C1-C4 (Data source)

Scenario information	Value
Collection process – kg collected separately	1 kg
Collection process – kg collected with mixed waste	0 kg
Recovery process – kg for re-use	0 kg
Recovery process – kg for recycling	0,5505 kg
Recovery process – kg for energy recovery	0,0648 kg
Disposal (total) – kg for final deposition	0,3847 kg
Scenario assumptions e.g. transportation	Transportation is estimated to be 20 km to the closest waste handling site from client location. By > 32-ton lorry (Euro 5)

THIRD-PARTY VERIFICATION STATEMENT

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15804+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.

The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

Verified tools

Tool verifier: Magaly Gonzalez Vazquez
Tool verification validity: 27 March 2025 - 26 March 2028

Sarah Curpen as an authorized verifier for EPD Hub Limited 25.02.2026



ANNEX

This Environmental Product Declaration “Frese Flow and Pressure Control Valves” covers the following product groups, all of which are brass-based products:

- Frese OPTIMA Compact Standard-series (DN10 - DN50)
- Frese OPTIMA Compact Veriflow-series (DN10 - DN50)
- Frese PV Compact (DN15 - DN32)
- Frese PV Compact Spectrum-series (DN15 - DN32)
- Frese PV-SIGMA Compact (DN15 - DN32)
- Frese PV-SIGMA Compact Spectrum-series (DN15 - DN32)
- Frese SIGMA Compact (DN10 - DN32)
- Frese MODULA (DN15 - DN25/25L)
- Frese MODULA Direct (DN15)
- Frese MODULA Direct-series (DN15)
- Frese MODULA Pro-series (DN15 - DN32)
- Frese ALPHA (DN15-DN50)
    - Frese ALPHA Cartridge Type 10
    - Frese ALPHA Cartridge Type 11
    - Frese ALPHA Cartridge Type 20
    - Frese ALPHA Cartridge Type 30
    - Frese ALPHA Cartridge Type 40
- Frese COMBIFLOW 6-way (DN15 - DN20)
- Frese OPTIMIZER 6-way (DN15 - DN20)
- Frese Partnervalve (DN15 - DN50)
- Frese DPRV (DN15 - DN32)
- Frese STBV VODRV (DN15 - DN50)
- Frese STBV VODRV, partner (DN15 - DN50)
- Frese STBV FODRV (DN15 - DN50)
- Frese STBV Range DRV (DN15 - DN50)

The declaration covers the relevant accessories and spare parts linked to these product groups, including:

- Frese P/T plugs
- Frese Metering Station (DN15 - DN50)
- Frese Strainer (DN15 - DN50)
- Frese Strainer Ball valve (DN15 - DN25)