ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

ELGEF PLUS TRANSITION ADAPTER AND PRESSURE TAPPING VALVE

GEORG FISCHER PIPING SYSTEMS LTD.

EPD HUB, HUB-1572
Publishing on 11.07.2024, last updated on 11.07.2024, valid until 11.07.2029

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Georg Fischer Piping Systems Ltd
Address	Ebnatstrasse 111
Contact details	sustainability.ps@georgfischer.com
Website	https://www.gfps.com

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR version 1.1, 5 Dec 2023
Sector	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Niklas Schmidt, Georg Fischer Piping Systems Ltd.
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐Internal verification ☒ External verification
EPD verifier	Imane Uald Iamkaddam, as an authorized verifier acting for EPD Hub Limited

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	ELGEF Plus Transition adapter and Pressure tapping valve
Additional labels	ELGEF Plus Transition adapter (brass, stainless steel), ELGEF Plus Stop off saddle
Product reference	ELGEF Plus Transition adapter (brass, CW725R), 720 920 738
Place of production	Schaffhausen, Switzerland
Period for data	2022
Averaging in EPD	Multiple products
Variation in GWP-fossil for A1-A3	+14.64% / -12.48 %

ENVIRONMENTAL DATA SUMMARY

Declared unit	1kg
Declared unit mass	1kg
GWP-fossil, A1-A3 (kgCO2e)	7,82E+00
GWP-total, A1-A3 (kgCO2e)	7,73E+00
Secondary material, inputs (%)	74.6
Secondary material, outputs (%)	70.5
Total energy use, A1-A3 (kWh)	36.1
Net fresh water use, A1-A3 (m3)	0.27

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

GF Piping Systems is one of the four divisions within Georg Fischer Corporation and a leading provider of plastic and metal piping systems with a global market presence. The product portfolio includes pipes, fittings, valves and the corresponding automation and jointing technology for industry, building technology as well as water and gas utilities. Georg Fischer Piping Systems proactively incorporates its environmental responsibility into its everyday business activities. Because environmental awareness is understood as one of the company‘s core values, internal structures and processes are geared towards sustainability. In this context, Life Cycle Assessments (LCA) are increasingly used to gain insight into the different life cycle phases of our systems.

PRODUCT DESCRIPTION

ELGEF Plus is a PE-system consisting of electrofusion couplers, fittings, and saddles, as well as spigot fittings and ball valves. Additionally, the system includes transition adapters, consisting of polyethylene and brass or stainless steel and pressure tapping valves, consisting of polyethylene and brass. The products are used in water and gas pipelines and industry applications to ensure leak-tight connections. Thanks to the unique modular system of the ELGEF Plus transition fittings, the products can be used extensively due to a modular system.

Components that enable a transition from metal to PE pipelines are an important component for water and gas supply networks. They are often used when integrating new PE pipes into existing networks as well as for repair works. In addition, water meters can be installed easily and reliably in this way. Connecting pumps and metal flow control valves to fixed components is easy with the rotatable adapter piece of the ELGEF Plus system, even under difficult conditions. The representative product for this EPD is the ELGEF Plus transition adapter made of PE and brass (CW725R), while the EPD also covers the transition adapter (CW617N/stainless steel), the stop off saddle and the pressure tapping valve. The pressure tapping valve is used for branching off water or gas main lines by electrofusion and tapping. The integrated brass valve allows the flow to be opened and closed directly at the branch, making it a valuable component of the water or gas piping system.

Further information can be found at https://www.gfps.com.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	83	Brass (CW725R), Italy
Minerals	-	-
Fossil materials	17	PE100, Germany
Bio-based materials	-	-

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	-
Biogenic carbon content in packaging, kg C	-

FUNCTIONAL UNIT AND SERVICE LIFE

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

SUBSTANCES, REACH - VERY HIGH CONCERN

Substances of very high concern	EC	CAS
Lead	231-100-4	7439-921

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	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

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.

In regard to the representative product at hand, the environmental impacts considered for the product stage cover the manufacturing of raw materials, polyethylene and brass used in the production. For packaging, cardboard and PE-LD were used. The study also considers the material losses occurring during the manufacturing processes and the impacts of green hydroelectricity transmission.

The ELGEF Plus transition adapter consists of polyethylene and brass. The components are produced in Europe. In the manufacturing process, the polyethylene is injection moulded over the brass adapter.

Waste polyethylene that occurs during the production process is to be recycled in module A3, whereas the waste brass is to be sorted and pressed. The packaging used during transport from the supplier to the fabrication site (A2) is part of a multi-use system, like Euro-pallets. Additionally, units of the ELGEF Plus transition adapter are protected by a PE-LD foil, which must be wrapped around each adapter for application purposes. In order to foster sustainable manufacturing practices and responsible resource management, a share of recycled material is used. The protected adapters are then packed together in cardboard boxes. Not included in A3 are the infrastructure at the production site and the administration activities of the employees.

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 transportation distances are based on the locations to which the item was sold the most and which, therefore, accounts for the majority of transportation. Regarding the ELGEF Plus transition adapter, the transportation distance is 170km from the plant in Schaffhausen, Switzerland to the Sales Company in Albershausen, Germany. Installation waste treatment and transport to the treatment facility are included in module A5, where 100 km was selected as the average distance.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase. The product does not emit any substances or consumes energy in this phase.
Air, soil, and water impacts during the use phase have not been studied.

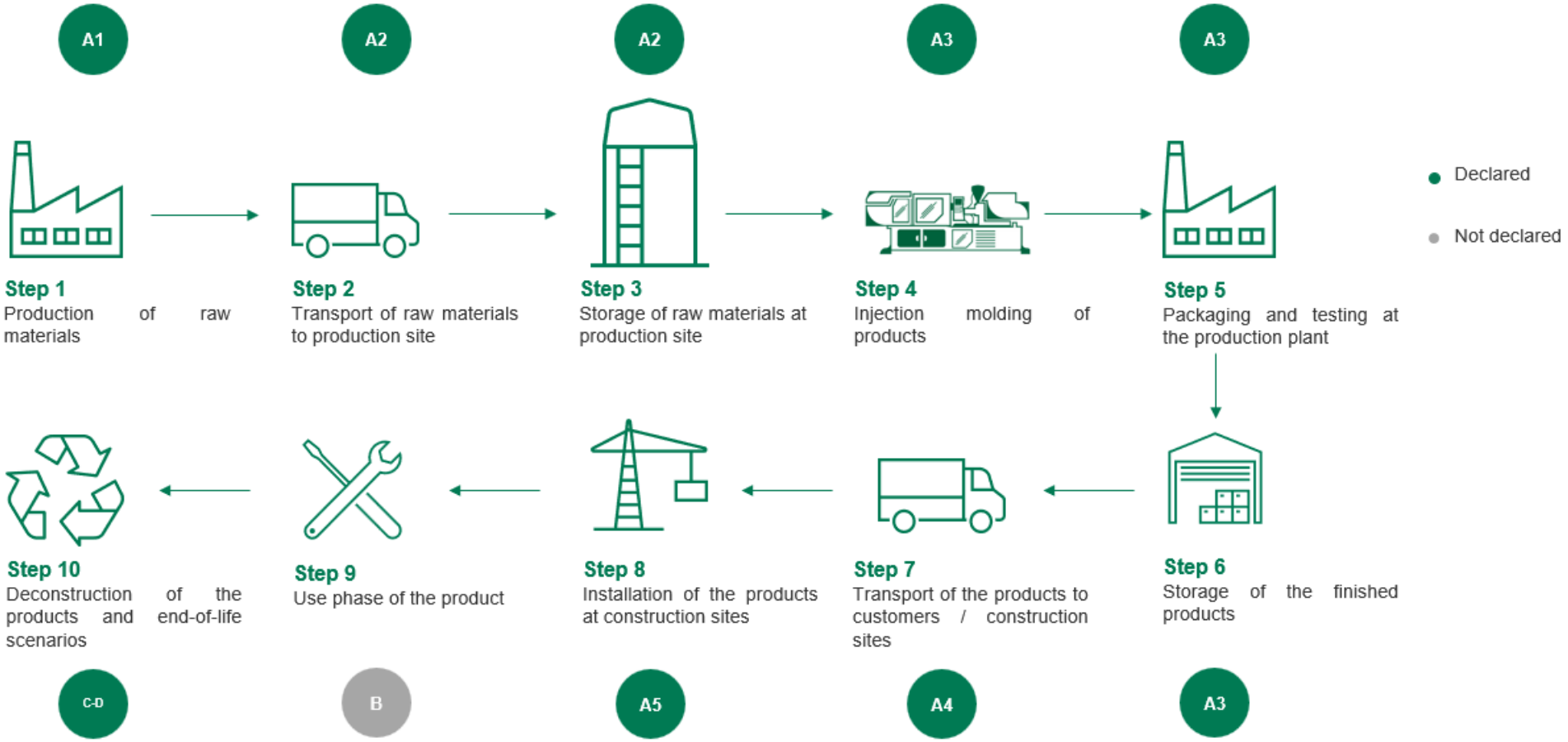
PRODUCT END OF LIFE (C1-C4, D)

The end-of-life stage data for this EPD is based on the following two sources. The proportion of recycled brass is based on data from the World Steel Association (WSA), while the proportion of recycled, incinerated, and landfilled plastic is based on data from the European Committee.

Module D covers the benefits and loads of brass and plastic processing as well as packaging waste processing.

At the end of the economic or technical lifetime of the piping system, which is expected to be 100 years for polyethylene, the products are taken out together with the pipes. This means that deconstruction is a side activity of new installations, hence zero resources and energy are consumed during deconstruction stage C1. The products are assumed to be fully separated into their unique materials. Waste processing and disposal have been modelled to reflect average European scenarios. As a conservative assumption, the transport distance to waste processing or disposal is 100 km by truck. 85% of the brass is assumed to be recycled, while the other 15% end up in a landfill. Over 40% of the polyethylene is supposed to be incinerated, around 30% is recycled, and the remaining share is sent to landfills.

MANUFACTURING PROCESS



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.

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 materials	No allocation
Ancillary materials	No allocation
Manufacturing energy and waste	Allocated by mass or volume

AVERAGES AND VARIABILITY

Type of average	Multiple products
Averaging method	Representative product
Variation in GWP-fossil for A1-A3	+14.64% / -12.48 %

This EPD covers the product range of ELGEF Plus transition adapters as well as the ELGEF Plus pressure tapping valve. The representative product for this EPD is the ELGEF Plus transition adapter d32-1 (CW725R) with a GWP fossil A1-A3 emission of 7.85 kgCO2e. The transition adapter made of brass (CW617N) has 14.64% higher GWP fossil A1-A3 emission, the transition adapter made of stainless steel has 10.19% higher GWP fossil A1-A3 emission, the pressure tapping valve has 12.48% lower GWP fossil A1-A3 emission than the representative product, and the stop off saddle has 4.2% lower GWP fossil A1-A3 emission.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.8, Plastics Europe, Federal LCA Commons and One Click LCA databases as sources of environmental data.

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

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	7,69E+00	4,05E-02	-4,48E-03	7,73E+00	3,17E-02	1,00E-01	MND	MND	MND	MND	MND	MND	MND	MNR	9,39E-03	2,41E-01	7,32E-03	-2,50E+00
GWP – fossil	kg CO_2e	7,68E+00	4,05E-02	9,07E-02	7,82E+00	3,17E-02	2,89E-03	MND	MND	MND	MND	MND	MND	MND	MNR	9,38E-03	2,40E-01	7,32E-03	-2,50E+00
GWP – biogenic	kg CO_2e	-9,00E-03	1,16E-05	-9,56E-02	-1,05E-01	1,21E-05	9,75E-02	MND	MND	MND	MND	MND	MND	MND	MNR	3,63E-06	5,87E-04	4,84E-06	-8,59E-06
GWP – LULUC	kg CO_2e	1,52E-02	1,54E-05	4,62E-04	1,57E-02	1,29E-05	2,59E-06	MND	MND	MND	MND	MND	MND	MND	MNR	3,46E-06	2,73E-05	1,63E-06	-4,31E-03
Ozone depletion pot.	kg CFC_{-11}e	4,51E-07	9,21E-09	5,61E-09	4,66E-07	6,99E-09	3,71E-10	MND	MND	MND	MND	MND	MND	MND	MNR	2,16E-09	2,26E-09	5,78E-10	-1,49E-07
Acidification potential	mol H^+e	4,24E-01	1,70E-04	3,73E-04	4,25E-01	1,31E-04	1,45E-05	MND	MND	MND	MND	MND	MND	MND	MNR	3,97E-05	2,42E-04	1,28E-05	-7,79E-02
EP-freshwater[2)]	kg Pe	8,41E-03	3,35E-07	4,10E-06	8,42E-03	2,68E-07	6,31E-08	MND	MND	MND	MND	MND	MND	MND	MNR	7,68E-08	9,68E-07	2,19E-08	-5,89E-03
EP-marine	kg Ne	2,26E-02	5,04E-05	1,12E-04	2,28E-02	3,83E-05	6,54E-06	MND	MND	MND	MND	MND	MND	MND	MNR	1,18E-05	6,05E-05	5,10E-06	-5,30E-03
EP-terrestrial	mol Ne	3,12E-01	5,56E-04	9,96E-04	3,14E-01	4,23E-04	5,12E-05	MND	MND	MND	MND	MND	MND	MND	MNR	1,30E-04	6,80E-04	4,42E-05	-6,59E-02
POCP ("smog")[3)]	kg NMVOCe	8,69E-02	1,75E-04	3,21E-04	8,74E-02	1,29E-04	1,59E-05	MND	MND	MND	MND	MND	MND	MND	MNR	4,17E-05	1,84E-04	1,46E-05	-1,86E-02
ADP-minerals & metals[4)]	kg Sbe	1,04E-02	1,08E-07	5,97E-07	1,04E-02	1,10E-07	2,20E-08	MND	MND	MND	MND	MND	MND	MND	MNR	2,20E-08	2,14E-06	4,38E-09	-1,77E-03
ADP-fossil resources	MJ	1,04E+02	6,02E-01	1,84E+00	1,06E+02	4,59E-01	3,18E-02	MND	MND	MND	MND	MND	MND	MND	MNR	1,41E-01	2,56E-01	4,16E-02	-3,25E+01
Water use[5)]	m^3e depr.	6,43E+00	2,68E-03	2,30E+00	8,73E+00	2,01E-03	1,10E-03	MND	MND	MND	MND	MND	MND	MND	MNR	6,30E-04	1,14E-02	1,73E-04	-1,61E+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.

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	2,18E+01	6,86E-03	7,70E+00	2,95E+01	5,38E-03	1,43E-03	MND	MND	MND	MND	MND	MND	MND	MNR	1,59E-03	4,02E-02	5,07E-04	-5,61E+00
Renew. PER as material	MJ	5,96E-01	0,00E+00	9,12E-01	1,51E+00	0,00E+00	-9,12E-01	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	2,24E+01	6,86E-03	8,62E+00	3,10E+01	5,38E-03	-9,11E-01	MND	MND	MND	MND	MND	MND	MND	MNR	1,59E-03	4,02E-02	5,07E-04	-5,61E+00
Non-re. PER as energy	MJ	9,85E+01	6,02E-01	1,45E+00	1,01E+02	4,59E-01	3,18E-02	MND	MND	MND	MND	MND	MND	MND	MNR	1,41E-01	2,56E-01	4,16E-02	-3,19E+01
Non-re. PER as material	MJ	7,32E+00	0,00E+00	6,80E-01	8,00E+00	0,00E+00	-7,45E-01	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	-5,44E+00	-1,81E+00	2,59E+00

Total use of non-re. PER	MJ	1,06E+02	6,02E-01	2,13E+00	1,09E+02	4,59E-01	-7,13E-01	MND	MND	MND	MND	MND	MND	MND	MNR	1,41E-01	-5,18E+00	-1,77E+00	-2,93E+01
Secondary materials	kg	7,46E-01	1,76E-04	3,32E-02	7,79E-01	1,51E-04	6,45E-05	MND	MND	MND	MND	MND	MND	MND	MNR	3,91E-05	4,37E-04	9,34E-06	-4,52E-01
Renew. secondary fuels	MJ	3,83E-03	1,93E-06	2,24E-02	2,62E-02	1,96E-06	6,08E-07	MND	MND	MND	MND	MND	MND	MND	MNR	3,95E-07	1,37E-05	3,99E-07	2,64E-06
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	2,11E-01	7,61E-05	5,40E-02	2,65E-01	5,42E-05	2,15E-05	MND	MND	MND	MND	MND	MND	MND	MNR	1,83E-05	1,62E-04	4,83E-05	-5,45E-02

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	1,42E+00	8,18E-04	7,34E-03	1,42E+00	6,61E-04	2,04E-04	MND	MND	MND	MND	MND	MND	MND	MNR	1,87E-04	1,96E-03	1,24E-01	-1,92E-02
Non-hazardous waste	kg	9,63E+01	1,33E-02	1,49E-01	9,64E+01	1,06E-02	5,28E-02	MND	MND	MND	MND	MND	MND	MND	MNR	3,07E-03	1,23E-01	4,25E-02	4,20E-02
Radioactive waste	kg	2,38E-04	4,01E-06	9,78E-06	2,52E-04	3,03E-06	1,09E-07	MND	MND	MND	MND	MND	MND	MND	MNR	9,43E-07	1,31E-06	0,00E+00	-1,31E-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	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,47E-02	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	7,05E-01	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MNR	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	9,93E-02	MND	MND	MND	MND	MND	MND	MND	MNR	0,00E+00	2,25E+00	0,00E+00	0,00E+00

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

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	4,98E+00	4,01E-02	9,11E-02	5,12E+00	3,14E-02	5,95E-03	MND	MND	MND	MND	MND	MND	MND	MNR	9,29E-03	2,40E-01	6,11E-03	-2,89E-01
Ozone depletion Pot.	kg CFC-$_{11}$e	2,40E-07	7,29E-09	4,77E-09	2,52E-07	5,54E-09	3,00E-10	MND	MND	MND	MND	MND	MND	MND	MNR	1,71E-09	1,84E-09	4,58E-10	-7,72E-09
Acidification	kg SO_2e	2,94E-01	1,33E-04	2,93E-04	2,94E-01	1,02E-04	1,11E-05	MND	MND	MND	MND	MND	MND	MND	MNR	3,09E-05	1,92E-04	9,87E-06	-1,55E-03
Eutrophication	kg PO_4^3e	8,97E-02	3,02E-05	1,76E-04	8,99E-02	2,35E-05	1,29E-04	MND	MND	MND	MND	MND	MND	MND	MNR	7,03E-06	1,33E-04	2,39E-04	-3,50E-04
POCP (“smog”)	kg C_2H_4e	1,12E-02	5,23E-06	2,79E-05	1,13E-02	4,15E-06	1,34E-06	MND	MND	MND	MND	MND	MND	MND	MNR	1,20E-06	8,09E-06	1,35E-06	-8,40E-05
ADP-elements	kg Sbe	8,27E-03	1,05E-07	5,73E-07	8,27E-03	1,08E-07	2,15E-08	MND	MND	MND	MND	MND	MND	MND	MNR	2,13E-08	2,14E-06	4,29E-09	-9,08E-07
ADP-fossil	MJ	7,26E+01	6,02E-01	1,84E+00	7,50E+01	4,59E-01	3,18E-02	MND	MND	MND	MND	MND	MND	MND	MNR	1,41E-01	2,56E-01	4,16E-02	-6,02E+00

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online
This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Imane Uald lamkaddam, as an authorized verifier acting for EPD Hub Limited
11.07.2024