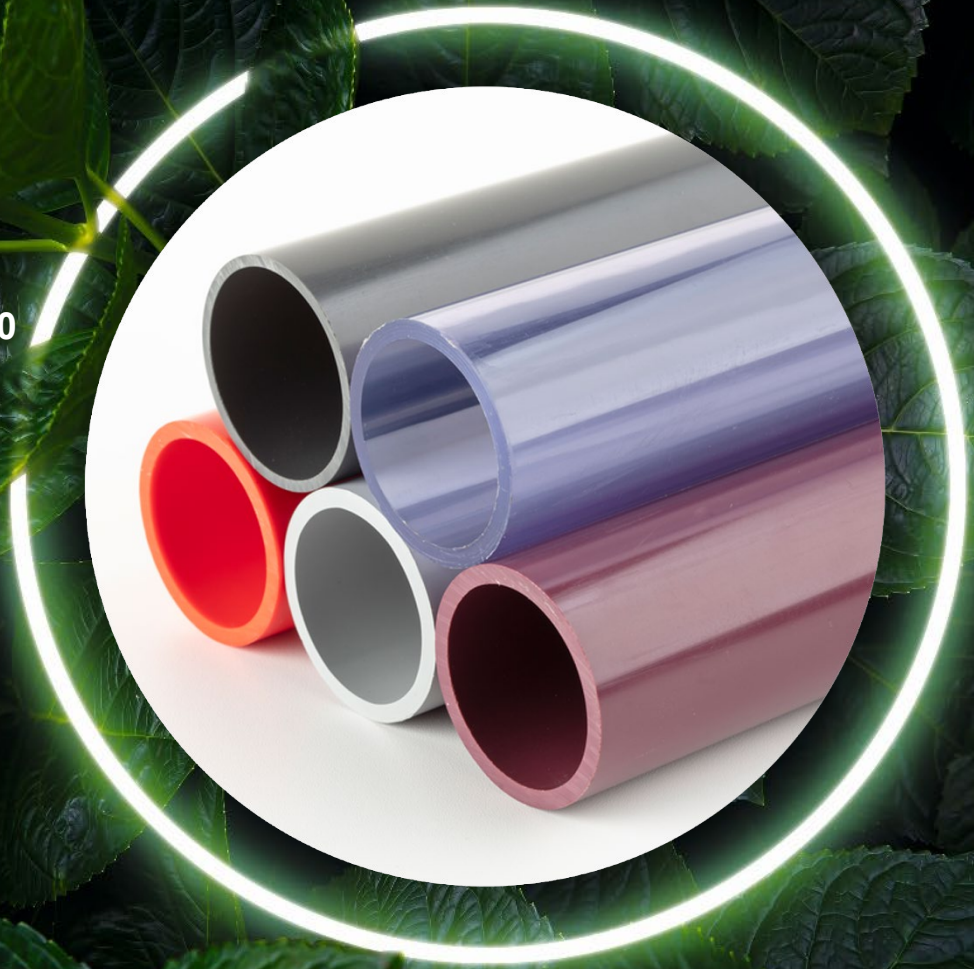
ENVIRONMENTAL PRODUCT DECLARATION

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

PVC-U PIPE BIO-ATTRIBUTED

GEORG FISCHER DEKA GMBH



EPD HUB, EPDHUB-1670
Publishing date 28 June 2024, last updated date 28 June 2024,
valid until 28 June 2029

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Georg Fischer Piping Systems Ltd.
Address	Ebnatstrasse 111, 8201 Schaffhausen, Switzerland
Contact details	Info.ps@georgfischer.com
Website	https://www.gfps.com/de-de/products-solutions/brands/deka.html

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	GF Piping Systems, Maurice Veldenzer
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Haiha Nguyen, 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	PVC-U Pipe Bio Attributed
Additional labels	Bio Attributed Content 10%
Product reference	161017110
Place of production	Germany
Period for data	Calendar year 2023
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	0%

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg
Declared unit mass	1 kg
GWP-fossil, A1-A3 (kgCO2e)	2,01E+00
GWP-total, A1-A3 (kgCO2e)	1,97E+00
Secondary material, inputs (%)	0.82
Secondary material, outputs (%)	31.9
Total energy use, A1-A3 (kWh)	9.88
Net fresh water use, A1-A3 (m3)	0.04

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

High-quality plastic pipes for demanding industries: Deka has been setting standards with pipe systems made of high-performance materials for the chemical and petrochemical industries since 1960.

Whether corrosion-resistant or thermally stable, Deka pipe systems are more than just plastic. Since 1960, the specialists have been reinventing the plastic pipe time and again. From the preparation of materials according to our own formulas, via production and finishing, to Europe's largest high-rack warehouse for plastic pipe systems. Whether PP, PE, PVC or high-performance thermoplastic, Deka, which joined Georg Fischer in 1998, sets the standard.

PRODUCT DESCRIPTION

This corrosion-resistant PVC-U pipe offers durability and maximum safety in aggressive applications. PVC-U is used wherever aggressive media such as acids or corrosive media are transported, e.g., in the chemical process and water treatment, metal treatment or microelectronics industries.

Product range: d6 to 400mm
Pressure rating: up to 16 bars
Temperature range: 0-60 °C

Further information can be found at https://www.gfps.com/de-de/products-solutions/brands/deka.html.

GF Piping systems incorporates a sustainable raw material on the basis of mass balance from voluntary schemes listed in the Renewable Energy Directive EU 2018/2001
The current EPD Standards do not allow for the claim of these benefits, therefore the LCA is based on a fully fossil raw material.
Annex 1 demonstrates the impact of a 10% Bio-Attributed raw material.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	-	
Minerals	4,4	Germany
Fossil materials	95,6	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	0.01

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

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

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.

The PVC-U pipes are manufactured from PVC-U resin and a number of additives like color pigments, heat stabilizers and chalk. Plasticizers are not used for the manufacturing of this product. Pigments are less than 1% and are not included in the calculation.
The continuous extruded pipe is labelled, cut to length of 5m and is packed in wooden frames.
On request they are additionally stretched in PE foil. The finished packed shipping unit can be directly picked up by a forklift.
During the manufacturing technical scrap (e.g. out of specified dimensions) is reused internally. Unusable scrap is collected separately and sold externally for recycling and thermal recovery.

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.

Average distance of transportation from production plant to a local distribution centre is assumed to be 200km. From there onwards the pipes are transported for an assumed distance of 100km to the final installation site. The transportation method is conventionally done by lorry. Vehicle capacity utilization volume factor is assumed to be 1 which means full load. In reality, it may vary but as role of transportation emissions in total results is small, the variety in load is assumed to be negligible. Empty returns are not taken into account as it is assumed that return trip is used by the transportation company to serve the needs of other clients. Transportation does not cause losses as product are packaged properly and are nonperishable items. Also, volume capacity utilization factor is assumed to be 1 for the nested packaged products.
In preparation pipes are cut the length, deburred, and chamfered to be ready to be cemented and installed. Environmental impacts from installation into the building include a (2%) product installation loss. To fix the installation in place, pipe clips made from PE or PP are used to hold the pipes (A5).
The impacts of material production, its processing and its disposal as installation waste, as well as the waste from packaging materials and release of biogenic carbon dioxide from wood pallets are also included (fixing materials).

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase.
Air, soil, and water impacts during the use phase have not been studied.

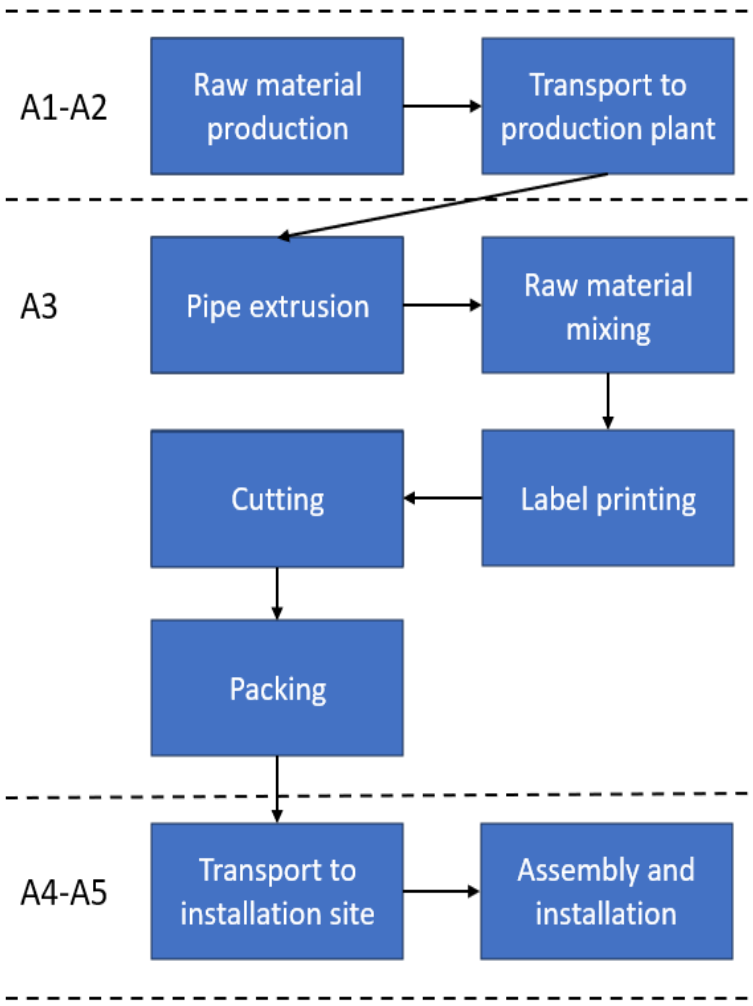
PRODUCT END OF LIFE (C1-C4, D)

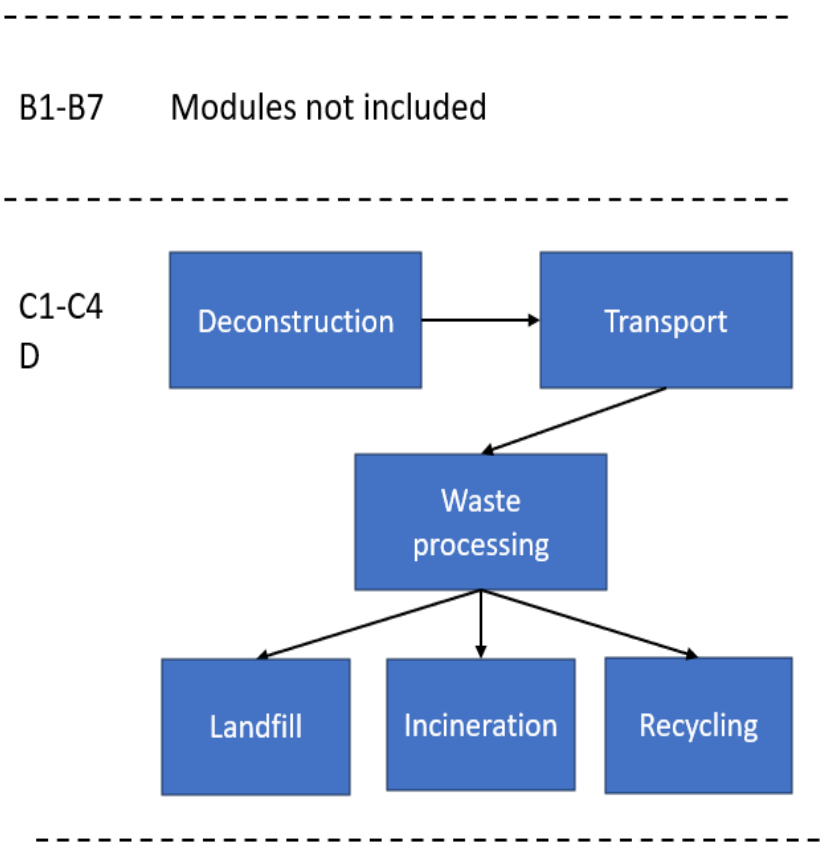
Disassembling and deconstruction is done on threaded joints where applicable. To ease handling, it is assumed that 0.03 kW/kg are used for electric power tools to cut the pipes into smaller sections (C1).

The end-of-life product is assumed to be sent to the closest facilities by lorry and is assumed to be 100 km away (C2). 100% of the end-of-life product is collected separately from the demolition site while 32.5% of plastics is sent to recycling and 42.6% plastics to incineration facilities (C3). Only 24.9% of the plastic materials in end-of-life product goes to landfill (C4). This represents the average of plastic waste treatment in the EU.[1]
Due to the recycling and incineration potential of PVC-U, the end-of-life product is converted into the recycled PVC-U while energy and heat is produced from its incineration (D). The benefits and loads of waste packaging materials in A5 are also considered in module D.

[1] https://www.europarl.europa.eu/topics/en/article/20181212STO21610/plastic-waste-and-recycling-in-the-eu-facts-and-figures#:~:text=Plastic%20waste%20treatment%20in%20Europe&text=Half%20of%20the%20plastic%20collected,32.7%20million%20tonnes%20in%202020 (10.06.2024)

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

AVERAGES AND VARIABILITY

Type of average	No averaging
Averaging method	Not applicable
Variation in GWP-fossil for A1-A3	0%

The product is sold globally, but main business is done in Europe due to costly shipping

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	1,75E+00	2,37E-02	1,96E-01	1,97E+00	3,60E-02	1,43E-01	MND	MND	MND	MND	MND	MND	MND	1,62E-02	1,66E-02	5,80E-01	3,76E-02	-2,37E+00
GWP – fossil	kg CO_2e	1,75E+00	2,37E-02	2,37E-01	2,01E+00	3,60E-02	1,00E-01	MND	MND	MND	MND	MND	MND	MND	1,59E-02	1,66E-02	5,80E-01	3,76E-02	-2,37E+00
GWP – biogenic	kg CO_2e	6,36E-03	7,81E-06	-4,11E-02	-3,47E-02	0,00E+00	4,30E-02	MND	MND	MND	MND	MND	MND	MND	2,30E-04	0,00E+00	0,00E+00	0,00E+00	5,80E-03
GWP – LULUC	kg CO_2e	1,59E-03	8,82E-06	3,38E-04	1,94E-03	1,40E-05	7,86E-05	MND	MND	MND	MND	MND	MND	MND	2,14E-05	7,40E-06	1,05E-04	2,84E-06	-6,11E-03
Ozone depletion pot.	kg CFC_{-11}e	1,11E-06	5,45E-09	6,69E-09	1,12E-06	8,45E-09	2,59E-08	MND	MND	MND	MND	MND	MND	MND	4,64E-10	3,75E-09	1,80E-08	8,13E-10	-1,01E-07
Acidification potential	mol H^+e	8,41E-03	9,78E-05	6,60E-04	9,17E-03	1,48E-04	4,05E-04	MND	MND	MND	MND	MND	MND	MND	4,35E-05	6,70E-05	5,06E-04	2,31E-05	-1,35E-02
EP-freshwater[2)]	kg Pe	7,87E-05	1,90E-07	3,14E-05	1,10E-04	2,58E-07	3,99E-06	MND	MND	MND	MND	MND	MND	MND	2,45E-06	1,35E-07	2,44E-06	4,46E-08	-8,08E-05
EP-marine	kg Ne	1,46E-03	2,86E-05	1,33E-04	1,62E-03	4,43E-05	7,21E-05	MND	MND	MND	MND	MND	MND	MND	8,28E-06	1,95E-05	1,38E-04	1,43E-05	-1,94E-03
EP-terrestrial	mol Ne	1,49E-02	3,16E-04	1,54E-03	1,68E-02	4,88E-04	7,60E-04	MND	MND	MND	MND	MND	MND	MND	9,79E-05	2,15E-04	1,45E-03	8,56E-05	-2,24E-02
POCP ("smog")[3)]	kg NMVOCe	5,31E-03	1,01E-04	4,74E-04	5,88E-03	1,54E-04	2,96E-04	MND	MND	MND	MND	MND	MND	MND	2,48E-05	6,68E-05	4,39E-04	3,29E-05	-7,78E-03
ADP-minerals & metals[4)]	kg Sbe	5,10E-05	5,93E-08	6,46E-07	5,17E-05	1,10E-07	1,35E-06	MND	MND	MND	MND	MND	MND	MND	1,38E-07	6,77E-08	1,07E-06	9,23E-09	-7,15E-06
ADP-fossil resources	MJ	4,93E+01	3,55E-01	3,88E+00	5,35E+01	5,44E-01	2,74E+00	MND	MND	MND	MND	MND	MND	MND	2,21E-01	2,45E-01	1,01E+00	6,24E-02	-5,24E+01
Water use[5)]	m^3e depr.	1,45E+00	1,60E-03	7,44E-02	1,52E+00	2,58E-03	5,86E-02	MND	MND	MND	MND	MND	MND	MND	3,89E-03	1,23E-03	5,42E-02	3,75E-04	-1,15E+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, PEF

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	6,38E-08	2,63E-09	3,90E-09	7,04E-08	3,71E-09	3,41E-09	MND	MND	MND	MND	MND	MND	MND	2,07E-10	1,40E-09	4,14E-07	4,61E-10	-1,19E-07
Ionizing radiation[6)]	kBq U235e	3,04E-01	1,71E-03	3,91E-02	3,45E-01	2,84E-03	1,59E-02	MND	MND	MND	MND	MND	MND	MND	2,86E-03	1,28E-03	7,40E-03	3,02E-04	-9,13E-01
Ecotoxicity (freshwater)	CTUe	3,69E+01	3,16E-01	2,30E+00	3,96E+01	4,56E-01	1,23E+00	MND	MND	MND	MND	MND	MND	MND	1,88E-01	2,14E-01	2,92E+01	6,69E-02	-4,02E+01
Human toxicity, cancer	CTUh	1,54E-09	8,01E-12	8,00E-11	1,63E-09	1,32E-11	5,51E-11	MND	MND	MND	MND	MND	MND	MND	6,80E-12	6,92E-12	1,02E-08	2,05E-12	-8,16E-10
Human tox. non-cancer	CTUh	4,65E-08	3,13E-10	2,55E-09	4,94E-08	4,73E-10	1,44E-09	MND	MND	MND	MND	MND	MND	MND	2,36E-10	2,11E-10	1,01E-08	3,95E-11	-2,09E-08
SQP[7)]	-	4,86E+00	3,89E-01	5,12E+00	1,04E+01	5,26E-01	4,40E-01	MND	MND	MND	MND	MND	MND	MND	4,92E-02	1,81E-01	8,95E-01	1,50E-01	-1,58E+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	2,45E+00	4,15E-03	9,43E-01	3,40E+00	7,65E-03	1,46E-01	MND	MND	MND	MND	MND	MND	MND	4,98E-02	3,84E-03	9,05E-02	1,16E-03	-6,71E+00
Renew. PER as material	MJ	3,87E-01	0,00E+00	3,48E-01	7,35E-01	0,00E+00	-3,52E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-2,88E-01	-9,59E-02	0,00E+00
Total use of renew. PER	MJ	2,84E+00	4,15E-03	1,29E+00	4,13E+00	7,65E-03	-2,06E-01	MND	MND	MND	MND	MND	MND	MND	4,98E-02	3,84E-03	-1,97E-01	-9,47E-02	-6,71E+00
Non-re. PER as energy	MJ	2,85E+01	3,55E-01	3,27E+00	3,22E+01	5,44E-01	1,55E+00	MND	MND	MND	MND	MND	MND	MND	2,21E-01	2,45E-01	1,01E+00	6,25E-02	-3,79E+01
Non-re. PER as material	MJ	2,08E+01	0,00E+00	4,02E-01	2,12E+01	0,00E+00	1,57E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-1,60E+01	-5,33E+00	6,26E-03
Total use of non-re. PER	MJ	4,93E+01	3,55E-01	3,68E+00	5,33E+01	5,44E-01	1,70E+00	MND	MND	MND	MND	MND	MND	MND	2,21E-01	2,45E-01	-1,50E+01	-5,27E+00	-3,79E+01
Secondary materials	kg	8,22E-03	1,01E-04	5,73E-04	8,89E-03	1,73E-04	3,54E-04	MND	MND	MND	MND	MND	MND	MND	3,63E-05	9,24E-05	1,37E-03	2,23E-05	3,55E-01
Renew. secondary fuels	MJ	8,09E-05	1,04E-06	5,11E-04	5,93E-04	1,72E-06	2,92E-04	MND	MND	MND	MND	MND	MND	MND	4,62E-07	1,04E-06	8,71E-05	8,57E-07	-1,21E-02
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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	3,53E-02	4,59E-05	1,95E-03	3,73E-02	7,24E-05	1,51E-03	MND	MND	MND	MND	MND	MND	MND	1,05E-04	3,37E-05	2,18E-02	6,68E-05	-3,90E-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	1,23E-01	4,62E-04	1,67E-02	1,41E-01	6,14E-04	4,82E-03	MND	MND	MND	MND	MND	MND	MND	1,24E-03	3,20E-04	1,02E-01	0,00E+00	-1,51E-01
Non-hazardous waste	kg	3,11E+00	7,66E-03	1,43E+00	4,55E+00	1,08E-02	2,25E-01	MND	MND	MND	MND	MND	MND	MND	1,14E-01	5,66E-03	3,87E-01	2,53E-01	-4,83E+00
Radioactive waste	kg	9,61E-05	2,39E-06	1,23E-05	1,11E-04	3,74E-06	5,19E-06	MND	MND	MND	MND	MND	MND	MND	8,91E-07	1,66E-06	4,13E-06	0,00E+00	-2,23E-04

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	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	1,00E-02	1,00E-02	0,00E+00	1,13E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	3,31E-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	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	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	1,47E+01	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	1,68E+00	2,34E-02	2,35E-01	1,94E+00	3,57E-02	9,82E-02	MND	MND	MND	MND	MND	MND	MND	1,59E-02	1,64E-02	5,74E-01	3,05E-02	-2,30E+00
Ozone depletion Pot.	kg CFC_{-11}e	1,11E-06	4,32E-09	5,77E-09	1,12E-06	6,70E-09	2,54E-08	MND	MND	MND	MND	MND	MND	MND	4,08E-10	2,98E-09	1,64E-08	6,45E-10	-8,43E-08
Acidification	kg SO_2e	7,02E-03	7,62E-05	5,33E-04	7,63E-03	1,15E-04	3,37E-04	MND	MND	MND	MND	MND	MND	MND	3,52E-05	5,23E-05	3,98E-04	1,76E-05	-1,13E-02
Eutrophication	kg PO_4^3e	3,38E-03	1,73E-05	1,13E-03	4,52E-03	2,61E-05	3,84E-04	MND	MND	MND	MND	MND	MND	MND	8,86E-05	1,22E-05	1,52E-03	1,41E-03	-3,03E-03
POCP (“smog”)	kg C_2H_4e	4,27E-04	3,02E-06	4,21E-05	4,73E-04	4,63E-06	2,62E-05	MND	MND	MND	MND	MND	MND	MND	1,72E-06	2,16E-06	4,34E-05	5,54E-06	-8,45E-04
ADP-elements	kg Sbe	4,54E-05	5,75E-08	6,36E-07	4,61E-05	1,07E-07	1,23E-06	MND	MND	MND	MND	MND	MND	MND	1,38E-07	6,61E-08	8,65E-07	8,92E-09	-7,14E-06
ADP-fossil	MJ	4,93E+01	3,55E-01	3,88E+00	5,35E+01	5,44E-01	2,74E+00	MND	MND	MND	MND	MND	MND	MND	2,21E-01	2,45E-01	1,01E+00	6,24E-02	-5,15E+01

ENVIRONMENTAL IMPACTS – FRENCH NATIONAL COMPLEMENTS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADP-elements	kg Sbe	4,54E-05	5,75E-08	6,36E-07	4,61E-05	1,07E-07	1,23E-06	MND	MND	MND	MND	MND	MND	MND	1,38E-07	6,61E-08	8,65E-07	8,92E-09	-7,14E-06
Hazardous waste disposed	kg	1,23E-01	4,62E-04	1,67E-02	1,41E-01	6,14E-04	4,82E-03	MND	MND	MND	MND	MND	MND	MND	1,24E-03	3,20E-04	1,02E-01	0,00E+00	-1,51E-01
Non-haz. waste disposed	kg	3,11E+00	7,66E-03	1,43E+00	4,55E+00	1,08E-02	2,25E-01	MND	MND	MND	MND	MND	MND	MND	1,14E-01	5,66E-03	3,87E-01	2,53E-01	-4,83E+00
Air pollution	m^3	3,44E+02	4,10E+00	3,11E+01	3,80E+02	5,52E+00	1,53E+01	MND	MND	MND	MND	MND	MND	MND	2,01E+00	2,34E+00	1,06E+02	6,97E-01	-7,12E+02
Water pollution	m^3	1,50E+01	2,60E-02	1,16E+01	2,67E+01	4,67E-02	1,08E+00	MND	MND	MND	MND	MND	MND	MND	9,51E-01	2,42E-02	2,37E+00	1,65E+00	-6,97E+00

ENVIRONMENTAL IMPACTS – TRACI 2.1. / 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	1,63E+00	2,34E-02	2,33E-01	1,89E+00	3,57E-02	5,41E-02	MND	MND	MND	MND	MND	MND	MND	1,58E-02	1,64E-02	5,72E-01	2,65E-02	-2,24E+00
Ozone Depletion	kg CFC_{-11}e	1,11E-06	4,31E-09	5,72E-09	1,12E-06	6,70E-09	2,79E-09	MND	MND	MND	MND	MND	MND	MND	4,04E-10	2,97E-09	1,64E-08	6,45E-10	-8,14E-08
Acidification	kg SO_2e	3,66E-01	4,64E-03	2,95E-02	4,00E-01	7,05E-03	9,46E-03	MND	MND	MND	MND	MND	MND	MND	1,93E-03	3,17E-03	1,21E-01	1,14E-03	-5,87E-01
Eutrophication	kg Ne	4,84E-04	9,84E-06	3,11E-05	5,25E-04	1,53E-05	1,03E-05	MND	MND	MND	MND	MND	MND	MND	1,88E-06	6,78E-06	5,16E-05	1,10E-05	-3,61E-04
POCP (“smog”)	kg O_3e	3,48E-03	7,41E-05	3,63E-04	3,92E-03	1,15E-04	1,04E-04	MND	MND	MND	MND	MND	MND	MND	2,05E-05	5,04E-05	3,52E-04	2,25E-05	-5,62E-03
ADP-fossil	MJ	5,91E+00	4,86E-02	2,30E-01	6,19E+00	7,50E-02	2,05E-01	MND	MND	MND	MND	MND	MND	MND	6,71E-03	3,34E-02	1,04E-01	8,28E-03	-4,40E+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.

HaiHa Nguyen, as an authorized verifier acting for EPD Hub Limited
28.06.2024

VERIFIED ISO 14025

ANNEX 1

GF Piping systems incorporates a share of sustainable raw material on the basis of mass balance from voluntary schemes listed in the Renewable Energy Directive EU 2018/2001. The current EPD Standards do not allow for the claim of these benefits, therefore the actual improvements are modelled here.

Currently (2024) GF Piping Systems uses up to 10% of Bio-Attributed PVC as a standard in the grey DEKADUR PVC-U Pipes:

- SDR 9 High Performance d6 – d110
- SDR 13.6 d12 – d160
- SDR 21 d25 – d315

Given the significance of the CO2e emissions from the raw material production itself, the use of Bio Attributed PVC-U holds the biggest potential in reducing these, contributing to a more sustainable product.

The use of 10% Bio-Attributed PVC-U material reduces the CO2e emissions by 8.5% (A1-A3).

The exact quantities may vary due to material availability and are published in the GF sustainability report.