ENVIRONMENTAL PRODUCT DECLARATION

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

GF iJOINT

EPD HUB, HUB-6810
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GENERAL INFORMATION

MANUFACTURER

Manufacturer	Georg Fischer TPA S.r.l.
Address	Via Seminella 50/M, 16012 Busalla (GE) Italy
Contact details	tpa.ps@georgfischer.com
Website	www.georgfischer.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	Construction 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	Thomas Vogel
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

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	GF iJOINT
Additional labels	
Product reference	GF iJOINT compression fittings and saddles portfolio
Place(s) of raw material origin	EU
Place of production	Busala (Genova), Italy
Place(s) of installation and use	World
Period for data	Full year 2025
Averaging in EPD	Multiple products
Variation in GWP-fossil for A1-A3 (%)	-25% / +25%
GTIN (Global Trade Item Number)	-
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	5,18

ENVIRONMENTAL DATA SUMMARY

Declared unit	1kg
Declared unit mass	1 kg
Mass of packaging	0,092 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	4,96
GWP-total, A1-A3 ($kgCO_2e$)	4,89
Secondary material, inputs (%)	6,26
Total energy use, A1-A3 (kWh)	27,5
Net freshwater use, A1-A3 (m^3)	0,04

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

With a rich history in industrial innovation since 1802, GF is actively reshaping itself to get into top ranking in Flow Solutions for Buildings, Industry and Infrastructure. GF delivers Excellence in Flow through essential products and solutions that enable safe and sustainable transport of water and other fluids worldwide. Following the Uponor acquisition and integration, GF has brought together its collective expertise and technologies into a unified portfolio of Flow Solutions for Buildings. This allows GF to offer reliable systems that perform throughout a building's entire lifecycle – from construction to daily operations – ensuring they are both future-proof and sustainable. Headquartered in Switzerland, GF is listed on the SIX Swiss Exchange.

PRODUCT DESCRIPTION

GF iJoint encloses a portfolio for water transportation of compression fittings (ISO 14236), branch and tapping saddles to be connected with plastic pipes. The pipe connections are detachable. The majority are in above-ground piping; buried installations for preliminary installations e.g. in agriculture are possible. Typical applications are in agriculture, utilities and irrigation systems. This study covers the full portfolio, even the main material of iJoint is plastic (92%), some items (thread connectors) contain brass, and some contain iron/stainless steel (saddles). The background of this mix is the full system approach which demands flexibility and options on piping installation modifications during operation.

Further information can be found at: www.georgfischer.com

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	8	EU
Minerals	0	
Fossil materials	92	EU
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	0,039

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1kg
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	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.

A market-based approach is used in modelling the electricity mix utilized in the factory.
The manufacturing process begins with the injection moulding of plastic raw materials into dedicated multicavity molds shaping the single components. These are next step assembled automatically or by hand, depending on the size, to become the finished fitting product. The packaging process comprises bagging for fittings up to diameter 32mm before they are packed into suitable cardboard boxes and palletized for delivery to the finished goods warehouse. Quality control supervises at each step of production.
The use of green energy in manufacturing is demonstrated through contractual instruments (GOs, RECs), and its use is ensured throughout the validity period of this EPD.

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 product portfolio is mainly (90% of weights) sold in EU, which is modelled by a transport average distance of 500km per truck. 18% of described portfolio is sold worldwide which is described by container ship transportation of 7.000km and 850km for harbour to site transporttaion..
The product is installed on site following a manual process that requires only the use of a wrench to close the compression nut onto the pipe in order to guarantee the necessary leak tightness and pull-out resistance. No special or electrical equipment is needed.

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.

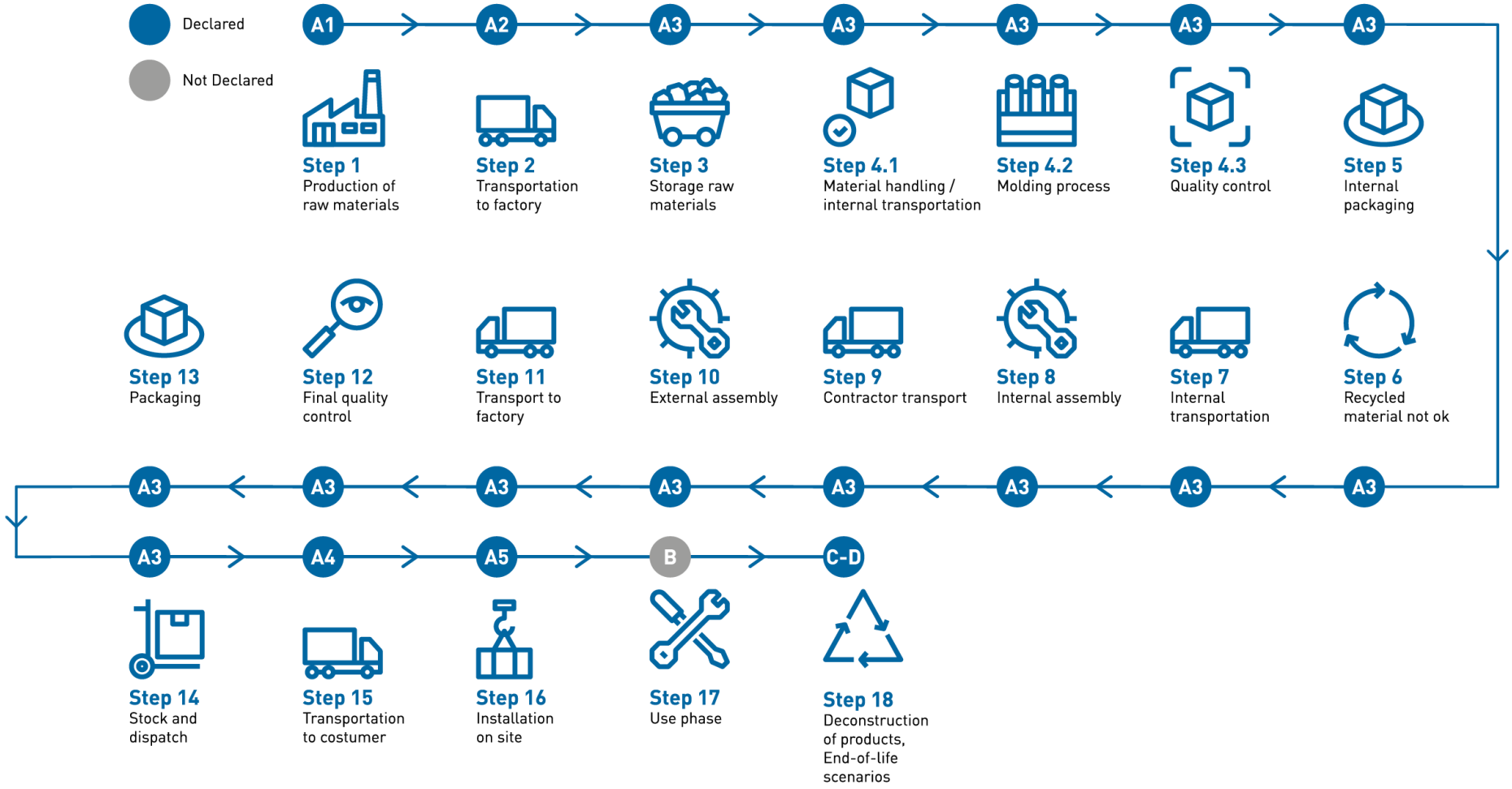
PRODUCT END OF LIFE (C1-C4, D)

At EoL the full pipe installation is disassembled manually (C1 energy = 0).

90% of the fittings are assumed to be sent to plastics and metal recycling (C3), 10% is sent to landfill (C4) within other construction waste except the enclosed sealing which are 100% landfill; the assumed transportation distance is 50km/each by truck (C2).
Beyond the system boundaries (D), loads and benefits for the treatment of steel, plastic and waste cardboard packaging recycling and waste wood packaging incineration into energy have been studied and considered.

Products meet the legal requirements at validation date on limited Substances of Very High Concern (SVHC), the product contains not any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

LIFE CYCLE FLOW DIAGRAM



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

This study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012 + A2:2019. Excluded modules are Use stage modules (B1-B7).
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 process which data are 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 life cycle analysis includes all industrial processes from raw material acquisition to production, distribution and end-of-life stages.
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.

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	Physical Properties
Packaging material	Physical Properties
Ancillary materials	Physical Properties
Manufacturing energy and waste	Physical Properties

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	Multiple products
Grouping method	Based on average results of product
Variation in GWP-fossil for A1-	-25% / +25%

The EPD represents a group of products manufactured at a single production facility. The grouping includes a portfolio of 435 individual product variants, which are modelled as an average product based on a mass-weighted aggregation of the included products.
The products are composed primarily of plastic materials (approximately 92%) and metallic components (approximately 8%). While the general product design and functionality are consistent across the portfolio, variations occur in geometry, weight, and relative material composition. These differences result in variations in environmental impacts between individual product variants, which are reflected through the declared variation in GWP-fossil (A1–A3).
All products covered by this EPD are manufactured at one production facility, for which primary data has been collected. The declared product group represents approximately 20% of the total production volume of this

site. The production processes, technologies, and operational conditions are consistent across the product portfolio and comparable to the remaining production at the facility. Therefore, the dataset is considered representative for the manufacturing processes applied at this site.
Upstream processes for metallic raw materials involve multiple external suppliers, covering approximately 85% of the total metal input. These supply chains are modelled using generic background data representative of the European market, ensuring an adequate representation of upstream environmental impacts.
The geographical scope of the EPD is Europe, reflecting both the manufacturing location and the typical sourcing regions of raw materials.
Overall, the applied grouping approach, including the number of product variants, the consistent production processes, and the representative material composition, ensures that the declared results are representative of the product portfolio included in the Redeclared results are representative of the product portfolio included in the EPD.

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 v3.10.1 and 3.11 and One Click LCA databases as sources of environmental data.
- Allocation used in Ecoinvent environmental data sources follow the methodology allocation, Cut-off, EN 15804+A2.
- EU wooden packaging EoL scenario by EUROSTAT.
No additional references have been used in the LCA.

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	4,66E+00	2,11E-01	1,42E-02	4,89E+00	1,43E-01	1,97E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,35E-03	7,69E-01	2,16E-03	-7,87E-02
GWP – fossil	kg CO_2e	4,60E+00	2,11E-01	1,46E-01	4,96E+00	1,42E-01	6,20E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,34E-03	7,60E-01	2,15E-03	1,59E-02
GWP – biogenic	kg CO_2e	5,80E-02	1,28E-04	-1,35E-01	-7,65E-02	6,73E-05	1,35E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,18E-06	8,33E-03	1,05E-05	-9,49E-02
GWP – LULUC	kg CO_2e	8,12E-04	6,80E-05	2,97E-03	3,85E-03	5,40E-05	4,13E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,19E-06	1,16E-03	5,01E-07	3,94E-04
Ozone depletion pot.	kg $CFC\text{-}_{11}$e	3,01E-05	4,76E-09	3,78E-09	3,01E-05	2,84E-09	3,02E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,99E-10	4,59E-09	7,88E-11	2,32E-10
Acidification potential	mol H^+e	1,66E-02	6,60E-04	6,62E-04	1,79E-02	1,00E-03	2,04E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,98E-05	1,45E-03	2,41E-05	5,62E-05
EP-freshwater[2)]	kg Pe	1,79E-03	1,46E-05	6,83E-05	1,88E-03	1,41E-05	1,97E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,05E-07	2,22E-04	3,73E-06	-2,26E-05
EP-marine	kg Ne	2,31E-03	2,30E-04	2,69E-04	2,81E-03	3,14E-04	5,26E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,03E-05	4,22E-04	6,13E-06	-4,87E-05
EP-terrestrial	mol Ne	2,51E-02	2,50E-03	1,97E-03	2,96E-02	3,43E-03	3,79E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,12E-04	2,61E-03	6,59E-05	-3,85E-04
POCP ("smog")[3)]	kg NMVOCe	8,25E-03	1,04E-03	6,54E-04	9,95E-03	1,13E-03	1,29E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,65E-05	8,38E-04	2,41E-05	-9,54E-05
ADP-minerals & metals[4)]	kg Sbe	1,02E-04	7,32E-07	1,24E-06	1,04E-04	4,25E-07	1,07E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,16E-08	3,29E-06	3,77E-09	1,03E-07
ADP-fossil resources	MJ	9,92E+01	2,97E+00	2,35E+00	1,05E+02	1,96E+00	1,10E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,32E-01	4,99E+00	5,09E-02	2,98E-01
Water use[5)]	m^3e depr.	3,25E-01	1,55E-02	7,74E-02	4,18E-01	1,04E-02	5,33E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,00E-04	1,59E-01	2,43E-03	6,17E-02

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	1,28E-07	1,68E-08	1,01E-08	1,55E-07	1,19E-08	1,95E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,72E-10	7,87E-09	3,69E-10	5,37E-10
Ionizing radiation[6)]	kBq U235e	5,07E-01	3,39E-03	9,36E-03	5,20E-01	2,02E-03	5,42E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,45E-04	1,23E-01	6,74E-05	1,41E-02
Ecotoxicity (freshwater)	CTUe	1,09E+04	4,41E-01	1,19E+00	1,09E+04	3,57E-01	1,09E+02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,08E-02	1,82E+00	3,21E-02	1,50E+00
Human toxicity, cancer	CTUh	7,32E-05	3,44E-11	2,75E-10	7,32E-05	2,30E-11	7,32E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,52E-12	1,57E-10	8,54E-13	9,33E-12
Human tox. non-cancer	CTUh	1,49E-05	1,80E-09	2,70E-09	1,49E-05	1,08E-09	1,50E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,05E-11	5,18E-09	5,48E-11	3,99E-10
SQP[7)]	-	5,12E+00	1,76E+00	1,98E+01	2,67E+01	1,28E+00	3,06E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,67E-02	1,50E+00	1,27E-01	-8,36E+00

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	4,40E+00	4,89E-02	7,90E+00	1,23E+01	3,03E-02	-1,22E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,12E-03	1,41E+00	1,01E-03	-1,24E+00
Renew. PER as material	MJ	7,12E-02	0,00E+00	2,62E+00	2,69E+00	0,00E+00	-2,62E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	-6,41E-02	-7,12E-03	9,57E-01
Total use of renew. PER	MJ	4,47E+00	4,89E-02	1,05E+01	1,50E+01	3,03E-02	-3,84E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,12E-03	1,35E+00	-6,11E-03	-2,87E-01
Non-re. PER as energy	MJ	8,15E+01	2,97E+00	2,00E+00	8,64E+01	1,96E+00	6,53E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,32E-01	-1,97E+01	5,09E-02	2,79E-01
Non-re. PER as material	MJ	1,79E+01	0,00E+00	3,67E-01	1,83E+01	0,00E+00	-3,67E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	-1,55E+01	-2,46E+00	1,16E-01
Total use of non-re. PER	MJ	9,94E+01	2,97E+00	2,37E+00	1,05E+02	1,96E+00	2,86E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,32E-01	-3,51E+01	-2,41E+00	3,94E-01
Secondary materials	kg	6,26E-02	1,33E-03	9,29E-02	1,57E-01	8,50E-04	1,63E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,86E-05	1,10E-03	1,64E-05	5,20E-02
Renew. secondary fuels	MJ	1,18E-02	1,75E-05	4,38E-02	5,56E-02	9,79E-06	5,56E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,69E-07	1,82E-05	3,10E-07	-7,56E-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	3,39E-02	3,52E-04	1,68E-03	3,60E-02	2,58E-04	3,39E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,61E-05	3,31E-03	-6,13E-04	6,53E-04

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	3,74E+00	1,81E-02	6,38E-02	3,83E+00	1,18E-02	3,89E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,12E-04	1,01E-01	2,27E-04	4,48E-03
Non-hazardous waste	kg	5,20E+00	2,38E-01	1,18E+00	6,62E+00	1,87E-01	2,37E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,15E-02	1,54E+00	7,24E-01	-2,78E-01
Radioactive waste	kg	1,59E-04	8,22E-07	2,33E-06	1,62E-04	4,89E-07	1,67E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,49E-08	3,09E-05	1,60E-08	3,63E-06

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	6,48E-01	6,48E-01	0,00E+00	1,77E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	8,01E-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	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	7,87E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	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	3,28E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,59E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	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	4,55E+00	2,09E-01	1,50E-01	4,90E+00	1,42E-01	6,97E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,29E-03	7,55E-01	2,13E-03	1,64E-02
Ozone depletion Pot.	kg $CFC_{-11}e$	2,58E-05	3,78E-09	3,08E-09	2,58E-05	2,26E-09	2,58E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,59E-10	3,91E-09	6,25E-11	1,91E-10
Acidification	kg SO_2e	1,38E-02	4,98E-04	5,01E-04	1,48E-02	7,71E-04	1,67E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,25E-05	1,21E-03	1,93E-05	6,96E-05
Eutrophication	kg PO_4^3e	2,80E-02	1,34E-04	1,22E-03	2,93E-02	1,43E-04	3,09E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,07E-06	2,16E-04	3,27E-06	1,81E-05
POCP (“smog”)	kg C_2H_4e	1,04E-03	4,74E-05	5,60E-05	1,14E-03	5,15E-05	1,49E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,11E-06	9,80E-05	1,26E-06	-1,00E-06
ADP-elements	kg Sbe	1,02E-04	7,16E-07	1,23E-06	1,04E-04	4,13E-07	1,07E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,09E-08	3,21E-06	3,64E-09	9,98E-08
ADP-fossil	MJ	9,37E+01	2,92E+00	2,19E+00	9,88E+01	1,93E+00	1,04E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,30E-01	2,87E+00	4,98E-02	4,84E-02

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	4,60E+00	2,11E-01	1,49E-01	4,96E+00	1,42E-01	6,20E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,34E-03	7,61E-01	2,15E-03	1,62E-02

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

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	4,49E+00	2,08E-01	1,48E-01	4,84E+00	1,40E-01	6,82E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,20E-03	7,42E-01	2,09E-03	1,64E-02
Ozone Depletion	kg CFC_{-11}e	2,57E-05	5,00E-09	3,95E-09	2,57E-05	2,98E-09	2,57E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,09E-10	4,84E-09	8,27E-11	2,38E-10
Acidification	kg SO_2e	2,52E-01	5,86E-04	5,56E-04	2,53E-01	8,83E-04	2,55E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,65E-05	1,23E-03	2,05E-05	2,76E-05
Eutrophication	kg Ne	6,33E-03	7,92E-05	6,15E-04	7,03E-03	7,46E-05	9,97E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,58E-06	2,55E-04	2,04E-06	-2,37E-05
POCP (“smog”)	kg O_3e	6,94E-02	1,59E-02	1,02E-02	9,55E-02	2,07E-02	1,44E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,08E-04	1,48E-02	4,06E-04	-2,09E-03
ADP-fossil	MJ	7,45E-01	0,00E+00	0,00E+00	7,45E-01	1,93E-01	3,86E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-9,18E-03

SCENARIO DOCUMENTATION

DATA SOURCES

Manufacturing energy scenario documentation

1. Market group for heat, district or industrial, natural gas, World, Ecoinvent, 0.0426 kgCO2e/MJ
2. Electricity production, wind, 1-3MW turbine, onshore, Denmark, Ecoinvent, 0.0132 kgCO2e/kWh
3. Electricity production, wind, 1-3MW turbine, onshore, Denmark, Ecoinvent, 0.0132 kgCO2e/kWh

Transport scenario documentation - A4 (Transport resources)

1. Market for transport, freight, sea, container ship, 7000.0 km
2. Market for transport, freight, lorry, 16-32 metric ton, diesel, unregulated, 850.0 km
3. Transport, freight, lorry, 16-32 metric ton, diesel, EURO 5, 500.0 km

Transport to the building site (A4) - Scenario documentation

Scenario parameter	Value
Capacity utilization (including empty return) %	80
Bulk density of transported products	184
Volume capacity utilization factor	<1

Installation at the building site (A5) - Scenario documentation

Scenario parameter	Value
Energy: type and consumption (MJ or kWh)	No energy consumption due to manual installation process
Water use (m^3)	0,1 kg of water for cleaning of installation, used for flushing and pressure test.
Ancillary materials: type and mass (kg)	none
Waste materials: type and mass (kg)	1% of products are lost due to installation mistakes or damage, collected within the same process (90%to recycling, 10% landfill, except sealings which are 100% landfill). All A5 product packaging EoL (wooden pallets, PE-bags, cardboard) is modelled by OCLCA average scenarios (mix of recycling, incineration and landfill).
Waste materials: output routes	90% recycling/10% landfill for plastic and metals, 100% landfill for sealings, all with distance to final plant of 50km by truck.
Direct emissions (kg)	none

End of life (C1-C4) - Scenario documentation

Scenario information	Value
Collection process: collected separately (kg)	90% of EoL products are collected separately.
Collection process: Mixed waste (kg)	10% of EoL products area collected within mixed waste.
Recovery: re-use (kg)	0
Recovery: recycling (kg)	0,8
Recovery: energy recovery (kg)	0
Disposal (kg)	0,2
Scenario assumptions e.g. transportation (mode, km) & other	At EoL the disassembly is only manually (C1 = 0). 90% of the fittings are assumed to be sent to plastics and metal recycling (C3), 10% is sent to landfill (C4); except for sealings which go 100% to landfill. The modeled transportation is 50km/each by truck (C2).

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

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

25.06.2026