ENVIRONMENTAL PRODUCT DECLARATION

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

GF MALLEABLE CAST IRON FITTINGS, HOT DIP GALVANIZED

EPD HUB, HUB-5928
Published on 04.04.2026, last updated on 04.04.2026, valid until 04.04.2031

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.

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Georg Fischer Fittings GmbH
Address	Mariazeller Str. 75, 3160 Traisen, Austria
Contact details	info.ps@georgfischer.com
Website	www.gfps.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	Magaly González Vázquez, 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 malleable cast iron fittings, hot dip galvanized
Additional labels	-
Product reference	-
Place(s) of raw material origin	EU
Place of production	3160 Traisen, Austria
Place(s) of installation and use	World
Period for data	Calendar year 2024
Averaging in EPD	No grouping
Variation in GWP-fossil for A1-A3 (%)	-
GTIN (Global Trade Item Number)	-
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	51,8

ENVIRONMENTAL DATA SUMMARY

Declared unit	1kg
Declared unit mass	1 kg
Mass of packaging	0,027 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	3,99
GWP-total, A1-A3 ($kgCO_2e$)	3,85
Secondary material, inputs (%)	133
Secondary material, outputs (%)	79,2
Total energy use, A1-A3 (kWh)	11,4
Net freshwater use, A1-A3 (m^3)	-0,01

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

The history of Georg Fischer Fittings GmbH goes back to 1833 where the closed hammer-smith mill was acquired by J.C. Fischer. The malleable cast iron fittings production in Traisen started in 1898. After several ownerships the company became Georg Fischer Fittings GmbH in 1995.
Today Georg Fischer Fittings GmbH is part of a worldwide operating Georg Fischer group, wherein the company belongs to the division GF Building Flow Solutions. The production site is the competence centre for malleable cast iron products within Georg Fischer and one of the last remaining manufacturers in Europe. Today more than 40 million malleable cast iron products are manufactured per year which makes Georg Fischer Fittings GmbH market leader in Western Europe.

PRODUCT DESCRIPTION

Malleable cast iron fittings with hot dip zinc galvanized surface, according to the standards standard ISO 49 and EN 10242, are made for conveying cold tap water, fuels, fire sprinklers, oils, gases and pressurized air, within the maximum pressure and temperature limits defined in ISO 49 and EN 10242: Between -20°C up to 120°C up to max. 25bar, depending on the application and the related national and international regulations / standards. Special types and pressure-tested fittings are also available for applications requiring higher pressure ratings or specific performance conditions. Fittings and union pieces parts are tested individually for leak tightness. The test pressures are above the values stipulated in the standard.
The portfolio in this study consists of 1.005 items. All are corrosion protected by hot dip zinc galvanizing, manufactured according to requirements of EN 10242, whereby a special process technology ensures that even layer thickness well above the required standard value (500 g/m² or 70µm on average) is achieved.
Georg Fischer Fittings GmbH malleable cast iron fittings are exclusively manufactured from decarburized annealed (white) malleable cast iron, type EN-GJMW-400-5 and with Rp and R jointing threads, from ¼ to 4 inch, whereas the size is designated based on the thread sizes defined in EN 10226-1 and ISO 7-1.
Further information can be found at: www.gfps.com and at www.fittings.at.
The Georg Fischer Fittings GmbH site in Austria is certified according to EN ISO 9001, EN ISO 14001 and ISO 45001.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	100	EU
Minerals	-	-
Fossil materials	-	-
Bio-based materials	-	-

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	0,0418

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 production of liquid cast iron, which is 100% recycled iron scrap. Recycled steel is modelled as electric arc furnace steel (“steel production, electric, low-alloyed) in module A1. End-of-life recycling benefits in module D are calculated by substitution of primary BOF steel (“steel production, converter, unalloyed), applying the net recycling approach according to EN 15804 +A2.

The following raw materials are delivered by trucks and molten in a cupola furnace: ferrosilicon; ferromanganese, 74.5% Mn; steel, hot roll formed (scrap E3); foundry coke; limestone; silicon carbide and petroleum coke. The used raw materials weigh average transport distance is 0,02 km per kilogram of raw material. A production loss of 25,93% (including cycle material in the foundry) of raw materials is considered. Ancillary materials, such as silica sand, bentonite, hydraulic oil, fireclay and others are considered as well, whereas the weighted average transport distance is 0,05 km per kilogram ancillary material. Most of the energy for processing heating comes from coke, followed by natural gas. Electricity for production comes from sourced green electricity and own run-of river hydropower. Key ancillary materials are sand, limestone and bentonite together with resins for sand-core forming, which leave the production to be recycled. Other ancillary materials such as oils, acids and liquids go to chemical recycling after production.

Slag from melting is separated and goes to landfills. The molten iron is then kept at temperature in a downstream furnace before being cast into raw parts using the sand molding process with the use of silica sand bonded by bentonite. Core making from silica sand is done with hot box binder systems or water glass. After casting, the solidified cast parts are cleaned by shot blasting and subsequently visually inspected. Next major step is the heat treatment (so-called annealing) to achieve the desired material properties (higher strength and malleability). After punching, grinding, pressing and / or shot blasting the hot dip galvanizing is carried out. As preparation for the

hot dip zinc galvanizing the parts are cleaned and pickled. Afterwards a flux is applied to inhibit oxidation of the now clean parts that are then dipped into a highly pure zinc bath with a temperature of 450°C. The used zinc weighted average transport distance is 0,04 km per kilogram raw zinc.
The thread cutting and turning of sealing faces is done prior to the washing and treatment with corrosion protection against flush rust in stock. For union items an assembly of the spare parts to the sales product takes place. In a further the fittings are packed into cardboard boxes and on wooden pallets, smaller sizes are additionally packed into PE bags. For internal transport forklifts are considered.
The use of green energy in manufacturing is demonstrated through contractual instruments (GOs, RECs, etc.), 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. Transportation of the final product from the production site to the building site is included in this stage. Items packed in cardboard boxes are transported on wooden Euro pallets covered with PE foil.
The products are shipped from the production site to stockholding distributors and distribution centres and then distributed locally. Transportation of 95% of product mass to European markets by heavy trucks is considered for an average of 867km. Sales to MEA markets consider heavy trucking for average 3352km. No materials are lost in transportation.
The product installation is done manually and is a long-time introduced standard process in jointing of metal pipes in potable water and gas installations. No extra energy is needed. A small amount of 0,2kg/kg of water for flushing the installation (cleaning) and pressure testing is considered. Other than in case of pipework systems including tubes, fittings and accessories, the malleable cast iron fitting is just one component of a piping system connected to other piping components by a standardised interface (jointing thread). Since GF does not produce complementary tubes or accessories, the environmental impact values are focused on the product in this EPD only. In addition, the mass of sealing materials (such as hemp or PTFE) is much lower than 1% of fitting mass and therefore negligible. The generation of product waste of 1% product mass at the construction site is considered in this scenario. Waste related to installation are the packaging materials on site, which are PE packaging foil and cardboards. PE foils and cardboard are collected and sent to plastic/paper recycling (50km/truck).

PRODUCT USE AND MAINTENANCE (B1-B7)

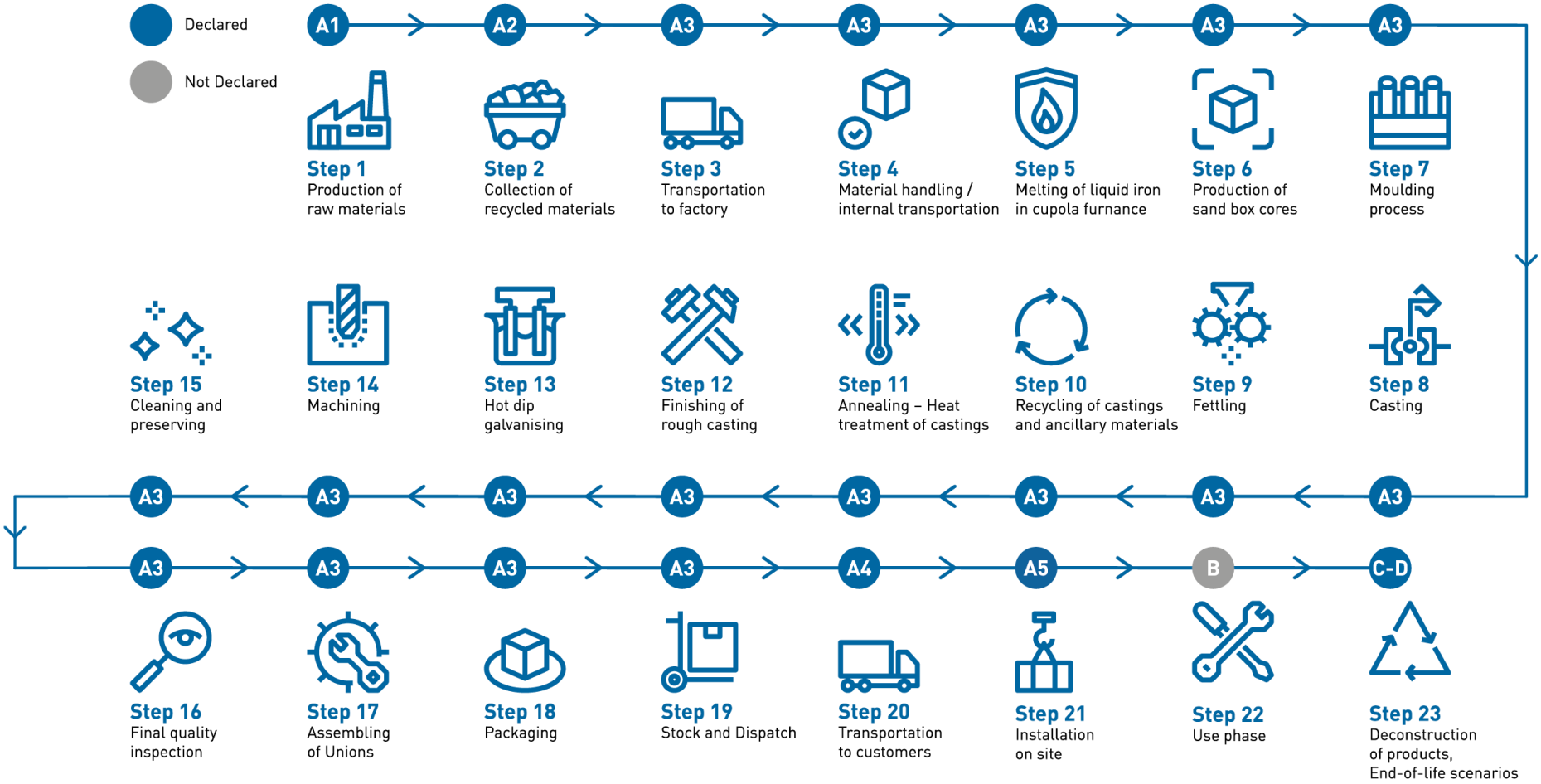
This EPD does not cover the use phase.
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

It is assumed that deconstruction is a site activity of renovation activities and that malleable cast iron fittings are deconstructed after a lifetime of minimum 50 years. Demolition and removal of the product itself is done manually and therefore no energy is needed. The transport of the demolished product to the nearest waste treatment facility is also considered. For transport to recycling facilities, the recommendation from the World Steel Association, 2020 to use average distances of 200km (incineration) / 50km (landfill) with a truck are applied. Although theoretically 100% of the products could be recycled, it is assumed that 5% goes to landfill due to imperfection in the deconstruction process. 95% of the end-of-life product is assumed to be sent to recycling facilities. After 50 years of lifetime no reuse or recovery of the product is made. Due to the recycling processes the End-of-Life product is melted to liquid iron and new products or raw materials are cast. The EoL scenario included in the EPD are currently in use and are representative of one of the most likely scenarios, EoL happens mainly in the EU.

Beyond the system boundaries (D), loads and benefits for the treatment of iron by recycling, polyethylene (packaging foil) by recycling, waste cardboard packaging recycling and waste wood packaging incineration into energy have been studied and considered.
All scenarios included are currently in use and are representative of one of the most likely scenarios.
Products meet the legal requirements at validation date on limited Substances of Very High Concern (SVHC).

MANUFACTURING PROCESS



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 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 that is 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. Excluded modules are Use stage modules (B1-B7).
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 made according to 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	No allocation
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	No grouping
Grouping method	Not applicable
Variation in GWP-fossil for A1-	-

This EPD is product and factory specific.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator for EPD Hub V3 and EPD Process Certification v3.2.4. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1/3.11/3.12 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1/3.11/3.12 environmental data sources follow the methodology ‘allocation, Cut-off, EN 15804+A2‘.

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.

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	1,27E+00	5,27E-02	2,53E+00	3,85E+00	1,44E-01	1,99E-01	ND	ND	ND	ND	ND	ND	ND	ND	5,39E-03	5,99E-02	3,12E-04	-2,03E-02
GWP – fossil	kg CO_2e	1,25E+00	5,26E-02	2,68E+00	3,99E+00	1,44E-01	4,52E-02	ND	ND	ND	ND	ND	ND	ND	ND	5,38E-03	5,98E-02	3,12E-04	6,18E-03
GWP – biogenic	kg CO_2e	1,17E-02	1,11E-05	-1,58E-01	-1,46E-01	3,26E-05	1,53E-01	ND	ND	ND	ND	ND	ND	ND	ND	1,22E-06	1,14E-05	-9,93E-08	-2,65E-02
GWP – LULUC	kg CO_2e	2,37E-03	2,06E-05	2,17E-03	4,56E-03	6,45E-05	4,71E-05	ND	ND	ND	ND	ND	ND	ND	ND	2,41E-06	6,13E-06	1,78E-07	1,07E-04
Ozone depletion pot.	kg $CFC\text{-}_{11}$e	1,43E-08	9,95E-10	8,89E-09	2,42E-08	2,13E-09	2,74E-10	ND	ND	ND	ND	ND	ND	ND	ND	7,95E-11	8,88E-10	9,04E-12	1,46E-10
Acidification potential	mol H^+e	6,98E-03	1,72E-04	1,23E-02	1,95E-02	4,91E-04	2,05E-04	ND	ND	ND	ND	ND	ND	ND	ND	1,84E-05	5,35E-04	2,21E-06	2,20E-05
EP-freshwater[2)]	kg Pe	7,42E-04	3,67E-06	9,67E-04	1,71E-03	1,12E-05	1,75E-05	ND	ND	ND	ND	ND	ND	ND	ND	4,19E-07	1,92E-06	2,57E-08	-5,51E-06
EP-marine	kg Ne	1,52E-03	5,80E-05	2,04E-03	3,61E-03	1,61E-04	4,49E-05	ND	ND	ND	ND	ND	ND	ND	ND	6,03E-06	2,49E-04	8,44E-07	-1,19E-05
EP-terrestrial	mol Ne	1,60E-02	6,31E-04	2,14E-02	3,81E-02	1,76E-03	4,15E-04	ND	ND	ND	ND	ND	ND	ND	ND	6,56E-05	2,73E-03	9,21E-06	-9,11E-05
POCP ("smog")[3)]	kg NMVOCe	4,97E-03	2,74E-04	6,53E-03	1,18E-02	7,24E-04	1,31E-04	ND	ND	ND	ND	ND	ND	ND	ND	2,70E-05	8,16E-04	3,30E-06	-1,62E-05
ADP-minerals & metals[4)]	kg Sbe	1,84E-04	1,46E-07	1,17E-02	1,18E-02	4,02E-07	1,18E-04	ND	ND	ND	ND	ND	ND	ND	ND	1,50E-08	2,15E-08	4,96E-10	3,53E-08
ADP-fossil resources	MJ	1,80E+01	7,62E-01	1,81E+01	3,68E+01	2,09E+00	4,00E-01	ND	ND	ND	ND	ND	ND	ND	ND	7,81E-02	7,79E-01	7,66E-03	1,38E-01
Water use[5)]	m^3e depr.	8,80E-01	3,87E-03	2,92E-01	1,18E+00	1,03E-02	1,22E-02	ND	ND	ND	ND	ND	ND	ND	ND	3,86E-04	2,01E-03	2,21E-05	1,71E-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	2,18E-07	5,23E-09	2,10E-07	4,32E-07	1,44E-08	4,56E-09	ND	ND	ND	ND	ND	ND	ND	ND	5,39E-10	1,53E-08	5,04E-11	1,73E-10
Ionizing radiation[6)]	kBq U235e	2,26E-01	8,61E-04	5,62E-02	2,83E-01	1,82E-03	2,93E-03	ND	ND	ND	ND	ND	ND	ND	ND	6,80E-05	3,32E-04	4,82E-06	4,09E-03
Ecotoxicity (freshwater)	CTUe	1,08E+02	9,41E-02	9,73E+00	1,18E+02	2,96E-01	1,23E+00	ND	ND	ND	ND	ND	ND	ND	ND	1,10E-02	4,45E-01	6,43E-04	4,19E-01
Human toxicity, cancer	CTUh	5,98E-09	8,68E-12	5,92E-09	1,19E-08	2,38E-11	1,20E-10	ND	ND	ND	ND	ND	ND	ND	ND	8,88E-13	6,10E-12	5,75E-14	2,70E-12
Human tox. non-cancer	CTUh	5,96E-08	4,95E-10	1,21E-07	1,81E-07	1,35E-09	1,87E-09	ND	ND	ND	ND	ND	ND	ND	ND	5,06E-11	9,59E-11	1,32E-12	1,17E-10
SQP[7)]	-	5,53E+00	7,63E-01	2,12E+01	2,75E+01	2,11E+00	3,05E-01	ND	ND	ND	ND	ND	ND	ND	ND	7,87E-02	5,15E-02	1,51E-02	-2,24E+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	3,51E+00	1,20E-02	7,35E+00	1,09E+01	2,87E-02	-2,83E-01	ND	ND	ND	ND	ND	ND	ND	ND	1,07E-03	4,89E-03	7,39E-05	-3,25E-01
Renew. PER as material	MJ	0,00E+00	0,00E+00	1,34E+00	1,34E+00	0,00E+00	-1,34E+00	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	2,63E-01
Total use of renew. PER	MJ	3,51E+00	1,20E-02	8,69E+00	1,22E+01	2,87E-02	-1,62E+00	ND	ND	ND	ND	ND	ND	ND	ND	1,07E-03	4,89E-03	7,39E-05	-6,16E-02
Non-re. PER as energy	MJ	1,75E+01	7,62E-01	1,18E+01	3,01E+01	2,09E+00	2,36E-01	ND	ND	ND	ND	ND	ND	ND	ND	7,81E-02	7,79E-01	7,66E-03	1,33E-01
Non-re. PER as material	MJ	0,00E+00	0,00E+00	1,73E-01	1,73E-01	0,00E+00	-1,73E-01	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	2,08E-03
Total use of non-re. PER	MJ	1,75E+01	7,62E-01	1,20E+01	3,02E+01	2,09E+00	6,28E-02	ND	ND	ND	ND	ND	ND	ND	ND	7,81E-02	7,79E-01	7,66E-03	1,35E-01
Secondary materials	kg	1,33E+00	3,29E-04	3,11E-01	1,64E+00	8,90E-04	1,64E-02	ND	ND	ND	ND	ND	ND	ND	ND	3,32E-05	3,22E-04	1,93E-06	1,32E-02
Renew. secondary fuels	MJ	1,32E-04	4,16E-06	3,70E-02	3,72E-02	1,13E-05	3,72E-04	ND	ND	ND	ND	ND	ND	ND	ND	4,22E-07	8,45E-07	3,99E-08	-2,03E-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	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	2,11E-02	1,12E-04	-3,41E-02	-1,30E-02	3,09E-04	-1,37E-04	ND	ND	ND	ND	ND	ND	ND	ND	1,15E-05	4,99E-05	7,97E-06	1,87E-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	6,02E-01	1,15E-03	1,58E+00	2,18E+00	3,54E-03	2,20E-02	ND	ND	ND	ND	ND	ND	ND	ND	1,32E-04	8,74E-04	8,46E-06	1,26E-03
Non-hazardous waste	kg	2,76E+00	2,25E-02	4,35E+01	4,63E+01	6,56E-02	6,92E-01	ND	ND	ND	ND	ND	ND	ND	ND	2,45E-03	1,27E-02	1,93E-04	-5,86E-02
Radioactive waste	kg	5,45E-05	2,13E-07	1,28E-05	6,76E-05	4,46E-07	6,99E-07	ND	ND	ND	ND	ND	ND	ND	ND	1,67E-08	8,15E-08	1,17E-09	1,05E-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	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	1,38E+00	1,38E+00	0,00E+00	2,33E-01	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,50E-01	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	1,07E-01	1,07E-01	0,00E+00	1,18E-03	ND	ND	ND	ND	ND	ND	ND	ND	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	2,74E-02	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	-1,11E-03
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,14E-02	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	-8,03E-04
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,60E-02	ND	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	-3,06E-04

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	1,25E+00	5,23E-02	2,68E+00	3,98E+00	1,43E-01	4,78E-02	ND	ND	ND	ND	ND	ND	ND	ND	5,35E-03	5,95E-02	3,09E-04	6,28E-03
Ozone depletion Pot.	kg $CFC_{-11}e$	1,18E-08	7,92E-10	8,03E-09	2,07E-08	1,70E-09	2,32E-10	ND	ND	ND	ND	ND	ND	ND	ND	6,34E-11	7,08E-10	7,18E-12	1,20E-10
Acidification	kg SO_2e	5,68E-03	1,31E-04	1,03E-02	1,61E-02	3,75E-04	1,69E-04	ND	ND	ND	ND	ND	ND	ND	ND	1,40E-05	3,76E-04	1,64E-06	2,45E-05
Eutrophication	kg PO_4^3e	1,28E-03	3,27E-05	2,46E-03	3,77E-03	9,14E-05	4,33E-05	ND	ND	ND	ND	ND	ND	ND	ND	3,41E-06	8,86E-05	5,21E-07	7,59E-06
POCP (“smog”)	kg C_2H_4e	3,65E-04	1,21E-05	6,38E-04	1,02E-03	3,34E-05	1,14E-05	ND	ND	ND	ND	ND	ND	ND	ND	1,25E-06	2,82E-05	1,55E-07	4,26E-07
ADP-elements	kg Sbe	1,84E-04	1,43E-07	1,17E-02	1,18E-02	3,92E-07	1,18E-04	ND	ND	ND	ND	ND	ND	ND	ND	1,46E-08	2,09E-08	4,86E-10	3,41E-08
ADP-fossil	MJ	1,45E+01	7,48E-01	1,72E+01	3,24E+01	2,06E+00	3,55E-01	ND	ND	ND	ND	ND	ND	ND	ND	7,70E-02	7,74E-01	7,58E-03	6,62E-02

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	1,92E-06	1,43E-07	1,35E-06	3,41E-06	3,92E-07	4,34E-08	ND	ND	ND	ND	ND	ND	ND	ND	1,46E-08	0,00E+00	4,86E-10	-5,28E-10
Hazardous waste disposed	kg	6,02E-01	1,15E-03	1,58E+00	2,18E+00	3,54E-03	2,20E-02	ND	ND	ND	ND	ND	ND	ND	ND	1,32E-04	8,74E-04	8,46E-06	1,26E-03
Non-haz. waste disposed	kg	2,76E+00	2,25E-02	4,35E+01	4,63E+01	6,56E-02	6,92E-01	ND	ND	ND	ND	ND	ND	ND	ND	2,45E-03	1,27E-02	1,93E-04	-5,86E-02
Air pollution	m^3	5,27E+02	1,21E+01	8,81E+02	1,42E+03	3,47E+01	1,48E+01	ND	ND	ND	ND	ND	ND	ND	ND	1,30E+00	8,50E+00	7,12E-02	6,17E-01
Water pollution	m^3	1,29E+01	4,02E-01	5,68E+00	1,90E+01	9,61E-01	2,06E-01	ND	ND	ND	ND	ND	ND	ND	ND	3,59E-02	3,29E-01	3,89E-03	1,29E-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	1,26E+00	5,27E-02	2,69E+00	3,99E+00	1,44E-01	4,53E-02	ND	ND	ND	ND	ND	ND	ND	ND	5,38E-03	5,99E-02	3,12E-04	6,28E-03

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	1,24E+00	5,18E-02	2,66E+00	3,95E+00	1,42E-01	4,72E-02	ND	ND	ND	ND	ND	ND	ND	ND	5,31E-03	5,91E-02	3,04E-04	6,25E-03
Ozone Depletion	kg CFC_{-11}e	1,52E-08	1,05E-09	9,72E-09	2,60E-08	2,24E-09	2,93E-10	ND	ND	ND	ND	ND	ND	ND	ND	8,38E-11	9,36E-10	9,53E-12	1,53E-10
Acidification	kg SO_2e	5,90E-03	1,52E-04	1,05E-02	1,65E-02	4,37E-04	1,74E-04	ND	ND	ND	ND	ND	ND	ND	ND	1,63E-05	4,95E-04	1,99E-06	1,31E-05
Eutrophication	kg Ne	8,98E-04	1,63E-05	2,06E-03	2,98E-03	4,60E-05	3,95E-05	ND	ND	ND	ND	ND	ND	ND	ND	1,72E-06	3,35E-05	2,22E-07	-4,88E-06
POCP (“smog”)	kg O_3e	9,15E-02	4,04E-03	1,23E-01	2,18E-01	1,11E-02	2,39E-03	ND	ND	ND	ND	ND	ND	ND	ND	4,15E-04	1,64E-02	5,69E-05	-4,70E-04
ADP-fossil	MJ	7,81E+00	7,63E-01	5,17E-01	9,09E+00	2,09E+00	1,21E-01	ND	ND	ND	ND	ND	ND	ND	ND	7,82E-02	0,00E+00	7,67E-03	-6,89E-03

SCENARIO DOCUMENTATION

DATA SOURCES

Manufacturing energy scenario documentation

1. Diesel, burned in building machine, World, Ecoinvent, 0.10 kgCO2e/MJ
2. District heating supply (2015), Austria, ProBas, 0.0506 kgCO2e/MJ
3. Electricity production, hydro, run-of-river, Austria, Ecoinvent, 0.0044 kgCO2e/kWh
4. Electricity production, hydro, run-of-river, Austria, Ecoinvent, 0.0044 kgCO2e/kWh
5. Electricity production, hydro, run-of-river, Austria, Ecoinvent, 0.0044 kgCO2e/kWh
6. Heat production, at coal coke industrial furnace 1-10MW, World, Ecoinvent, 0.16 kgCO2e/MJ
7. Hard coal, at mine, latinAmerica, BAFU, 0.27 kgCO2e/kg
8. Heat production, at hard coal industrial furnace 1-10MW, europeWithoutSwitzerland, Ecoinvent, 0.13 kgCO2e/MJ
9. Natural gas boiler heat generation (2010), Austria, ProBas, 0.0769 kgCO2e/MJ

Transport scenario documentation - A4 (Transport resources)

1. Transport, freight, lorry >32 metric ton, EURO5, 3352 km
2. Transport, freight, lorry >32 metric ton, EURO5, 867 km

Transport to the building site (A4) - Scenario documentation

Scenario parameter	Value
Capacity utilization (including empty return) %	80
Bulk density of transported products	5,43E+02
Volume capacity utilization factor	<1

Installation at the building site (A5) - Scenario documentation

Scenario parameter	Value
Energy: type and consumption (MJ or kWh)	-
Water use (m^3)	0,2kg/kg Tap water for cleaing and pressure test.
Ancillary materials: type and mass (kg)	-
Waste materials: type and mass (kg)	1% of product for installation corrections. 0,2kg tap water from cleaning and pressure test.
Waste materials: output routes	Product waste 95% recycling / 5% landfill; water goes back to processing.
Direct emissions (kg)	-

End of life (C1-C4) - Scenario documentation

Scenario information	Value
Collection process: collected separately (kg)	0,95kg to steel recycling.
Collection process: Mixed waste (kg)	0,05kg to landfill.
Recovery: re-use (kg)	0
Recovery: recycling (kg)	0,95
Recovery: energy recovery (kg)	0
Disposal (kg)	0
Scenario assumptions e.g. transportation (mode, km) & other	See C1-C4 description

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 is filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub cannot 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

Magaly González Vázquez, as an authorized verifier acting for EPD Hub Limited
04.04.2026