ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

PROGEF PIPES AND FITTINGS

GEORG FISCHER PIPING SYSTEMS LTD.

EPD HUB, HUB-4049

Publishing date 29.09.2025, last updated date 29.09.2025,
valid until 28.08.2030

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Georg Fischer Piping Systems Ltd
Address	Ebnatstrasse 111, 8201 Schaffhausen, Switzerland
Contact details	sustainability.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 1.1, 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	Emre Akay, Simon Kalyciok, Peter Barta
EPD verification	Independent verification of this EPD and data, according to ISO 14025: o Internal verification þ 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	PROGEF pipes and fittings
Place(s) of raw material origin	Europe
Place of production	Schaffhausen, Switzerland and Dautphetal, Germany
Place(s) of installation and use	Europe, USA, Asia
Period for data	calendar year 2024
Averaging in EPD	Multiple products and multiple factories
Variation in GWP-fossil for A1-A (%)	-0.95%/+1.26%
A1-A3 Specific data (%)	16,5

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg of PROGEF pipes and fittings
Declared unit mass	1 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	3,14E+00
GWP-total, A1-A3 ($kgCO_2e$)	3,10E+00
Secondary material, inputs (%)	1,44
Secondary material, outputs (%)	8,1
Total energy use, A1-A3 (kWh)	16,3
Net freshwater use, A1-A3 (m^3)	0,02

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

GF Industry and Infrastructure Flow Solutions is the leading flow solutions provider across the world. We enable the safe and sustainable transport of fluids.

PRODUCT DESCRIPTION

The PROGEF piping system by GF is a polypropylene (PP) welded system for safe fluid handling in critical industrial applications, providing unique mechanical properties, chemical resistance, outstanding weldability, and an especially high resistance to thermal distortion.

The PROGEF portfolio consists out of three different systems: PROGEF Standard (PP-H and PP-R), PROGEF Natural (PP-n) and PROGEF Plus (PP-H). While each system has its own unique material characteristics, all of them include a complete portfolio of pipes, fittings, valves, tools, jointing, process automation and measurement and control instrumentation.
PROGEF Standard meets chemical requirements in almost all applications and safeguards operations. The durability behind its performance offers long-term reliability and reduces downtime and maintenance expenses.

With its high surface finish, transparent and pigment-free material, and the possibility to use bead and crevice-free fusion technology, PROGEF Natural ensures exceptional quality and performance in various applications. This portfolio fulfills the purity requirements of many chemical, life science and food & beverage applications.

PROGEF Plus offers specified production and packaging processes preventing contamination before installation. Recognized leach-out results combined with certified LABS-compliance make PROGEF Plus possible to use for lower-demanding high purity applications. The portfolio is especially used in demanding applications in microelectronics, painting, and surface technology, where high surface quality and exceptional leach-out values are essential.

This EPD covers PROGEF pipes and fittings, manufactured by GF at state-of-the-art production facilities located in Germany and Switzerland. The products are made from polypropylene homopolymer (PP-H), selected for its excellent chemical resistance, thermal stability, and suitability for high-purity applications.

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

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	0	-
Minerals	0	-
Fossil materials	100	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	0,0139

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 kg of PROGEF pipes and fittings
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			As-sembly 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	Deconstruction/ demolition	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.

A market-based approach is used in modelling the electricity mix utilized in the factory.

PROGEF pipes and fittings are manufactured by GF at state-of-the-art production facilities located in Germany and Switzerland. The products are made from polypropylene homopolymer (PP-H), selected for its excellent chemical resistance, thermal stability, and suitability for high-purity applications. The raw material supply (A1) includes the extraction and processing of polypropylene granulate, sourced from certified suppliers in Europe. Manufacturing (A3) involves energy-efficient extrusion for pipes and injection molding for fittings, conducted under controlled or cleanroom conditions to minimize contamination and ensure compliance with industry-specific purity standards (e.g., for pharmaceuticals and microelectronics). Product assembly and quality control (A3) include rigorous inspection and testing procedures to ensure mechanical performance, dimensional accuracy, and purity. Waste generated during production is minimized and, when possible, reprocessed internally in line with purity requirements. When reprocessing is not possible, the manufacturing waste is recycled or incinerated. Packaging is designed to maintain product cleanliness during handling and transport. Products are typically sealed in polyethylene (PE) bags, and packed in corrugated cardboard boxes or wooden crates depending on product type and shipping mode. Packaging materials are recyclable and comply with EU, US, and Asian environmental and safety standards.

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.

In stage A4, transport from the production sites in Germany and Switzerland to distribution hubs and end users across Europe, Asia, and the USA is primarily by truck and sea freight. Transport distances and modes vary by destination but are optimized to reduce environmental impact, including route planning and shipment consolidation. The transport scenario is based on a weighted average scenario based on sales shares for the different markets. Module A5 considers several packaging waste treatment scenarios relevant for the markets covered by the scope.

PRODUCT USE AND MAINTENANCE (B1-B7)

No impacts are expected to occur during normal use of the product, so the use stage is not considered in the study.

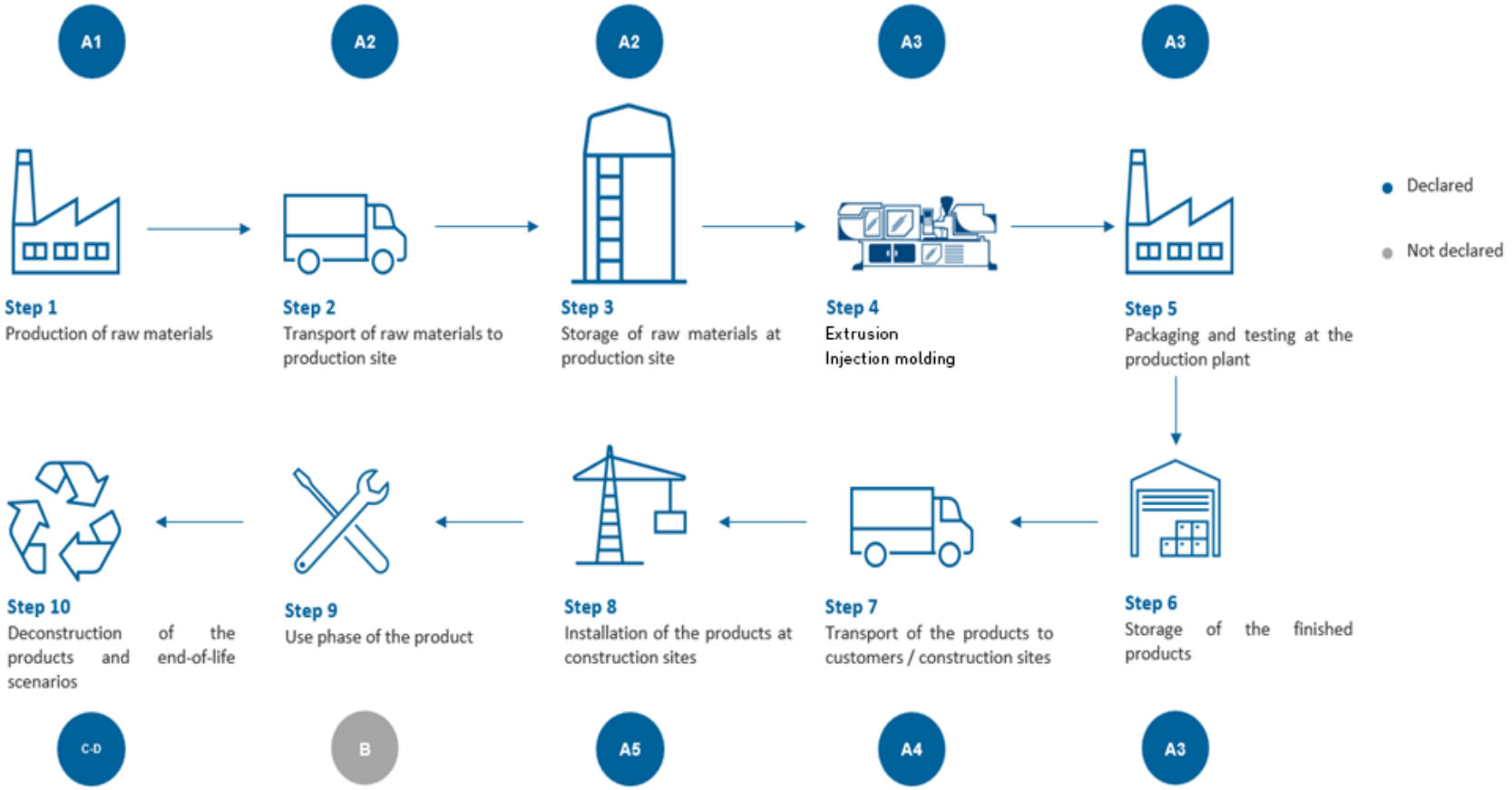
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

At the end of service life, PROGEF pipes and fittings are typically removed manually (C1), with no special deconstruction processes required. The system's modularity facilitate separation from other infrastructure components. Module C2 involves transport to local recycling or disposal facilities, generally via regional waste collection systems. At the end of their service life, PROGEF pipes and fittings are typically not suitable for reuse due to contamination risks from chemical or high-purity applications. Where mechanical recycling is not feasible - particularly in applications involving pharmaceuticals, microelectronics, or aggressive chemicals - the most common end-of-life treatment is incineration with energy recovery. The polypropylene (PP-H) material has a high calorific value and is well-suited for controlled incineration in municipal or industrial waste-to-energy (WTE) plants. During this process, thermal energy is recovered and can be converted into electricity and/or district heating, providing a measurable environmental benefit by offsetting the use of fossil fuels. Recycling and incineration rates are considered based on statistical data for the covered regions. Module C4 considers the case when recycling or energy recovery is not feasible,

PROGEF pipes and fittings may be disposed of via landfilling, in accordance with local waste management regulations. This is typically the case in regions or applications where material contamination prevents reuse or recycling, and where access to incineration with energy recovery is limited or not permitted. Polypropylene (PP-H) is a stable thermoplastic and does not generate hazardous substances under landfill conditions. In module D (benefits and loads beyond the system boundary), energy recovered from incineration may offset primary energy production, contributing to secondary energy credits. Additionally, where mechanical recycling is possible, recycled PP material can be used in non-critical applications, thereby reducing the need for virgin material in future production cycles. Benefits and loads related to recycling and incineration of packaging materials are also included in module D.

SYSTEM BOUNDARY



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

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

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

No significant material or energy flows have been deliberately excluded from the study. All relevant upstream (raw materials, transport), core (manufacturing, energy use, packaging), and downstream (transport, installation, end-of-life) processes have been considered. Maintenance, operational energy use during product use, and capital goods (e.g., machinery, infrastructure) are excluded as irrelevant as per EN 15804 guidance.

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	Allocated by mass or volume
Packaging material	Allocated by mass or volume
Ancillary materials	Not applicable
Manufacturing energy and waste	Allocated by mass or volume

Mass allocation was applied based on production volumes: 60% for pipes manufactured in Germany and 40% for fittings manufactured in Switzerland.

Transport distances for raw material supply and product distribution were estimated based on average logistics routes to main markets (Europe, Asia, USA).

End-of-life scenarios (C1–C4) assume average disposal conditions by region. Where data were unavailable for certain regions, EU-average data were used as proxies.

Packaging material weights were estimated based on sample product packaging configurations and averaged per product group.

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	Multiple products and multiple factories
Grouping method	Based on average results of product group - by total mass
Variation in GWP-fossil for A1-A3, %	-0.95%/+1.26%

This EPD covers PROGEF pipes and fittings made from polypropylene homopolymer (PP-H), designed for high-purity fluid applications. The grouping includes: Products covered: Injection-molded fittings (ranging in sizes d16-d500) and extruded pipes (ranging in sizes d16-d400). Manufacturing sites: Pipes produced in Germany (60% share in DU), fittings produced in Switzerland (40% share in DU) Geographical coverage: Products are sold globally, with primary markets in Europe, Asia, and the USA. Manufacturing similarity: Both product types use the same base polymer (PP-H), similar cleanroom-grade production controls, and comparable processing technologies (extrusion or injection molding). Sampling and data: Primary data was collected from each site for the reference year. No site-averaging was applied; instead, impacts were weighted by mass to reflect actual production volumes. This grouping approach provides a representative and conservative estimate of environmental performance for the full PROGEF product range.

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 v3.10.1/3.11 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1/3.11 environmental data sources follow the methodology ‘allocation, Cut-off, EN 15804+A2‘.

EN 15804:2012+A2:2019 – Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products

Ecoinvent v3.10.1 database (EN 15804 classification, cut-off)

EPD Hub Product Category Rules (PCR) v1.1

EPD Hub General Program Instructions (GPI) v1.2

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	2,51E+00	4,70E-01	1,14E-01	3,10E+00	3,44E-01	5,31E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,36E-02	4,85E-01	7,82E-02	-3,22E-01
GWP – fossil	kg CO_2e	2,51E+00	4,69E-01	1,65E-01	3,14E+00	3,44E-01	2,16E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,36E-02	4,85E-01	7,82E-02	-3,28E-01
GWP – biogenic	kg CO_2e	1,45E-03	9,31E-05	-5,09E-02	-4,94E-02	6,54E-05	5,10E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,79E-06	-8,74E-06	-4,69E-05	5,94E-03
GWP – LULUC	kg CO_2e	1,34E-03	1,66E-04	5,59E-04	2,07E-03	1,34E-04	1,27E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,12E-06	8,79E-06	5,37E-06	-3,05E-04
Ozone depletion pot.	kg CFC-$_{11}$e	1,15E-07	9,34E-09	1,86E-09	1,26E-07	6,48E-09	2,04E-11	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,52E-10	1,01E-10	2,15E-10	-1,06E-08
Acidification potential	mol H^+e	7,60E-03	1,47E-03	4,16E-04	9,48E-03	2,78E-03	6,57E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,34E-05	8,14E-05	5,90E-05	-1,49E-03
EP-freshwater[2)]	kg Pe	4,51E-04	3,11E-05	2,48E-05	5,07E-04	2,05E-05	3,47E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	9,39E-07	2,02E-06	8,66E-07	-1,31E-04
EP-marine	kg Ne	1,51E-03	4,95E-04	1,16E-04	2,12E-03	7,69E-04	1,41E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,45E-05	4,27E-05	1,73E-04	-2,32E-04
EP-terrestrial	mol Ne	1,56E-02	5,38E-03	1,27E-03	2,22E-02	8,48E-03	2,42E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,58E-04	3,76E-04	2,41E-04	-2,35E-03
POCP ("smog")[3)]	kg NMVOC	1,36E-02	2,30E-03	3,54E-04	1,63E-02	2,80E-03	9,59E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,69E-05	9,67E-05	1,02E-04	-1,42E-03
ADP-minerals & metals[4)]	kg Sbe	2,28E-05	1,54E-06	1,27E-06	2,56E-05	9,75E-07	4,68E-09	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,27E-08	6,08E-08	1,87E-08	-1,74E-06
ADP-fossil resources	MJ	8,03E+01	6,59E+00	7,95E-01	8,77E+01	4,71E+00	1,86E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,92E-01	8,73E-02	1,85E-01	-8,56E+00
Water use[5)]	m^3e depr.	5,56E-01	3,24E-02	4,05E-02	6,29E-01	2,14E-02	2,88E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	9,44E-04	1,40E-02	8,90E-04	-8,99E-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	Inci-dence	6,01E-08	3,69E-08	5,72E-09	1,03E-07	2,38E-08	1,26E-10	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,14E-09	6,54E-10	1,34E-09	-9,51E-09
Ionizing radiation[6)]	kBq U235e	1,80E-01	8,41E-03	3,99E-03	1,92E-01	5,35E-03	4,69E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,24E-04	4,04E-04	1,81E-04	-6,75E-02
Ecotoxicity (freshwater)	CTUe	6,09E+00	8,66E-01	4,40E-01	7,39E+00	5,72E-01	4,00E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,57E-02	1,34E-01	2,41E-01	-6,12E-01
Human toxicity, cancer	CTUh	5,49E-10	8,00E-11	4,99E-11	6,79E-10	6,13E-11	6,42E-13	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,29E-12	2,02E-11	4,01E-12	-5,31E-11
Human tox. non-cancer	CTUh	2,13E-08	4,14E-09	1,68E-09	2,71E-08	2,65E-09	4,37E-11	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,22E-10	7,79E-10	7,48E-10	-2,64E-09
SQP[7)]	-	7,10E+00	3,92E+00	8,38E+00	1,94E+01	2,39E+00	2,19E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,35E-01	8,97E-02	4,32E-01	-1,40E+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	1,99E+00	1,14E-01	6,52E+00	8,63E+00	7,37E-02	-5,31E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,14E-03	6,56E-03	2,85E-03	-6,52E-01
Renew. PER as material	MJ	0,00E+00	0,00E+00	4,16E-01	4,16E-01	0,00E+00	-4,16E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,28E-02
Total use of renew. PER	MJ	1,99E+00	1,14E-01	6,94E+00	9,04E+00	7,37E-02	-9,47E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,14E-03	6,56E-03	2,85E-03	-6,40E-01
Non-re. PER as energy	MJ	4,54E+01	6,59E+00	-1,82E+0	5,02E+01	4,71E+00	-2,72E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,92E-01	-1,03E+0	-2,87E+0	-9,30E+00
Non-re. PER as material	MJ	3,49E+01	0,00E+00	-2,03E+0	3,28E+01	0,00E+00	-4,93E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-8,52E+0	-2,43E+0	3,40E+00
Total use of non-re. PER	MJ	8,03E+01	6,59E+00	-3,86E+0	8,30E+01	4,71E+00	-7,65E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,92E-01	-1,89E+0	-5,30E+0	-5,90E+00
Secondary materials	kg	1,44E-02	3,02E-03	1,31E-02	3,04E-02	2,17E-03	1,29E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	8,63E-05	3,49E-04	6,69E-05	8,40E-02
Renew. secondary fuels	MJ	1,23E-04	3,81E-05	1,06E-03	1,22E-03	2,35E-05	1,30E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,09E-06	2,52E-06	1,25E-06	-7,77E-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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	1,47E-02	8,87E-04	8,49E-04	1,64E-02	5,81E-04	-6,94E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,65E-05	1,15E-04	-2,76E-03	-3,11E-03

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	9,29E-02	9,46E-03	9,52E-03	1,12E-01	6,67E-03	1,16E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,89E-04	4,72E-03	3,23E-04	-1,65E-02
Non-hazardous waste	kg	2,06E+01	2,00E-01	2,02E-01	2,10E+01	1,33E-01	1,04E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,87E-03	2,16E-01	3,70E+00	-2,03E+00
Radioactive waste	kg	4,58E-05	2,09E-06	1,01E-06	4,89E-05	1,33E-06	1,17E-08	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,56E-08	1,03E-07	4,42E-08	-1,73E-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	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	2,40E-02	2,40E-02	0,00E+00	1,17E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	8,10E-02	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	2,14E-02	MND	MND	MND	MND	MND	MND	MND	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	8,96E-03	MND	MND	MND	MND	MND	MND	MND	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	1,24E-02	MND	MND	MND	MND	MND	MND	MND	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	2,48E+00	4,66E-01	1,65E-01	3,11E+00	3,42E-01	6,39E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,35E-02	4,85E-01	7,49E-02	-3,20E-01
Ozone depletion Pot.	kg $CFC._{11}e$	9,24E-08	7,43E-09	1,82E-09	1,02E-07	5,15E-09	1,64E-11	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,00E-10	8,48E-11	1,72E-10	-8,56E-09
Acidification	kg SO_2e	6,27E-03	1,12E-03	3,14E-04	7,70E-03	2,19E-03	4,95E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,30E-05	5,85E-05	4,38E-05	-1,26E-03
Eutrophication	kg PO_4^3e	2,07E-03	2,84E-04	1,49E-04	2,50E-03	3,36E-04	6,44E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	8,30E-06	1,81E-05	2,72E-05	-2,31E-04
POCP (“smog”)	kg C_2H_4e	7,38E-04	1,06E-04	2,90E-05	8,74E-04	1,39E-04	1,34E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,09E-06	4,41E-06	1,47E-05	-9,69E-05
ADP-elements	kg Sbe	2,25E-05	1,50E-06	1,26E-06	2,52E-05	9,53E-07	4,55E-09	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,17E-08	5,76E-08	1,82E-08	-1,71E-06
ADP-fossil	MJ	7,72E+01	6,45E+00	7,24E-01	8,44E+01	4,62E+00	1,78E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,88E-01	8,04E-02	1,82E-01	-7,37E+00

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	2,25E-05	1,50E-06	1,26E-06	2,52E-05	9,53E-07	4,55E-09	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,17E-08	5,76E-08	1,82E-08	-1,72E-06
Hazardous waste disposed	kg	9,29E-02	9,46E-03	9,52E-03	1,12E-01	6,67E-03	1,16E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,89E-04	4,72E-03	3,23E-04	-1,65E-02
Non-haz. waste disposed	kg	2,06E+01	2,00E-01	2,02E-01	2,10E+01	1,33E-01	1,04E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,87E-03	2,16E-01	3,70E+00	-2,03E+00
Air pollution	m^3	4,24E+02	8,65E+01	2,55E+01	5,36E+02	6,35E+01	3,43E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,70E+00	3,75E+00	1,94E+00	-7,11E+01
Water pollution	m^3	4,54E+01	3,65E+00	3,73E-01	4,94E+01	2,56E+00	1,01E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,02E-01	5,10E-02	9,86E-02	-5,20E+00

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	2,51E+00	4,70E-01	1,65E-01	3,15E+00	3,44E-01	2,16E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,36E-02	4,85E-01	7,82E-02	-3,28E-01

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	2,42E+00	4,62E-01	1,65E-01	3,05E+00	3,39E-01	5,92E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,33E-02	4,85E-01	6,92E-02	-3,16E-01
Ozone Depletion	kg CFC-$_{11}$e	1,21E-07	9,85E-09	2,06E-09	1,33E-07	6,83E-09	2,15E-11	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,65E-10	1,06E-10	2,27E-10	-1,12E-08
Acidification	kg SO_2e	6,35E-03	1,30E-03	3,48E-04	8,00E-03	2,39E-03	5,89E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,84E-05	7,55E-05	5,36E-05	-1,23E-03
Eutrophication	kg Ne	1,27E-03	1,41E-04	1,03E-04	1,51E-03	1,45E-04	1,28E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,14E-06	2,32E-05	3,13E-05	-1,88E-04
POCP (“smog”)	kg O_3e	1,21E-01	3,44E-02	6,16E-03	1,62E-01	5,11E-02	1,44E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,01E-03	2,17E-03	1,50E-03	-1,58E-02
ADP-fossil	MJ	4,55E+01	6,60E+00	-1,82E+0	5,03E+01	4,71E+00	-2,72E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,92E-01	-1,03E+0	-2,87E+0	-9,29E+00

ENVIRONMENTAL IMPACTS – BEPALINGSMETODE, NETHERLANDS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Shadow price	€	3,57E-01	5,49E-02	2,81E-02	4,40E-01	4,86E-02	6,69E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,62E-03	4,33E-02	8,99E-03	-3,12E-02
Terrestrial ecotoxicity	DCB eq	2,23E-02	1,57E-03	3,09E-03	2,69E-02	1,45E-03	2,36E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,62E-05	5,04E-03	1,23E-03	-4,83E-04
Seawater ecotoxicity	DCB eq	4,67E+02	6,08E+01	4,84E+01	5,76E+02	4,50E+01	1,05E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,84E+00	1,00E+02	1,78E+01	-8,57E+01
Freshwater ecotoxicity	DCB eq	3,20E-02	5,49E-03	6,11E-03	4,36E-02	3,88E-03	1,12E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,67E-04	1,84E-02	1,40E-02	-3,48E-03
Human ecotoxicity	DCB eq	1,47E+00	1,94E-01	1,32E-01	1,80E+00	1,60E-01	1,76E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,82E-03	8,66E-02	2,78E-02	1,56E-02
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,96E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ETE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,24E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ADP Fossil Fuels	kg Sbe	3,71E-02	3,10E-03	3,48E-04	4,06E-02	2,22E-03	8,55E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	9,06E-05	3,87E-05	8,74E-05	-3,54E-03

THIRD-PARTY 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
29.09.2025