ENVIRONMENTAL PRODUCT DECLARATION

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

Sanipex gunmetal manifolds
Georg Fischer JRG AG

EPD HUB, HUB-3178
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Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Georg Fischer JRG AG
Address	Hauptstrasse 130, 4450 Sissach, Switzerland
Contact details	info.jrg.ps@georgfischer.com
Website	www.georgfischer.com

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR Version 1.1, 5 Dec 2023
Sector	Construction product
Category of EPD	Third party verified EPD
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

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	Sanipex gunmetal manifolds
Additional labels	-
Product reference	Sanipex gunmetal manifolds dim 12- 20
Place of production	Sissach, Switzerland
Period for data	2021
Averaging in EPD	Multiple products
Variation in GWP-fossil for A1-A3	-5,61% / +4,75%

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg
Declared unit mass	1 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	9,93E+00
GWP-total, A1-A3 ($kgCO_2e$)	9,86E+00
Secondary material, inputs (%)	46,2
Secondary material, outputs (%)	94,6
Total energy use, A1-A3 (kWh)	46,3
Net freshwater use, A1-A3 (m^3)	0,38

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

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

GF JRG is the building technology competence center within this chain and offers high quality, innovative products and customer and application oriented solutions. We have been setting standards since 1802 and are well known as a reliable partner with production sites and sales companies worldwide.

PRODUCT DESCRIPTION

JRG Sanipex is the world's first plastic pipe in pipe drinking water installation system. This products family includes manifolds made of low lead red bronze and mainly used for tap water.
The material is considered corrosion- and erosion- resistant, combined with a favorable combination of good castability with optimum machinability and high strength. It is also popular for direct contact with the medium, because red bronze is considered to be particularly low in dezincification due to its high copper content and it can be used for all water qualities of the drinking water regulations as well as according to all European standards in accordance with the new hygienic requirement in the Positive Lists for Organic Materials, 4MS Common Approach, not emitting taste, smell, heavy metals or harmful substances into the drinking water. Thanks to the die-casting process in combination with the sealing- and waterpocket free full-flow conegrip union connection technology from the JRG Sanipex system which guarantees low pressure losses, almost no noise pollution and which can be reopened and reused, the manifolds have very good zeta values.

Further information can be found at www.georgfischer.com

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	99,58	EU
Minerals	0	-
Fossil materials	0,42	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	0,0347

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	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.

The manifolds are made of gunmetal (lead reduced RG5 also known as CC499K). The material in the form of ingot is melted and continuously checked for the correct composition of the alloy. After fettling, the raw parts are mechanically treated and cleaned. In the next step the nuts (they have no contact with the medium and are made of a brass alloy with high mechanical strength), produced from bars in a separate process, are assembled. Each manifold is leak tested before or during assembly. Due to hygiene reasons the manifolds are packed in plastic bags made of recycled material. The next bigger purchasing unit is packed in cardboard boxes and shipped on EUR-pallets. Installation instructions are available as movie, online in several languages. Specific transport distances for the supply of raw materials, packaging and ancillary materials were taken into account and data for transport type from Ecoinvent 3.8 were selected. The waste generated during manufacturing consist of manufacturing scrap, that is recycled, incoming packaging, also recycled. Among the ancillary materials consumed in the production, chemicals are disposed while the majority of foundry sand is recycled.

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.

A4 - Transport to the building site

Average distances from the manufacturing plant to the installation sites are based on actual sales average figures. The transportation vehicle is assumed to be lorry for road transports. It is assumed that vehicles travel at full load capacity and that the return trips are used by transportation companies to ship other customers goods. There is no material loss during transportation as the fittings are well packed.

A5 - The product is installed by hand with manual tools. The installation does not require energy nor resources. There are no installation losses as the

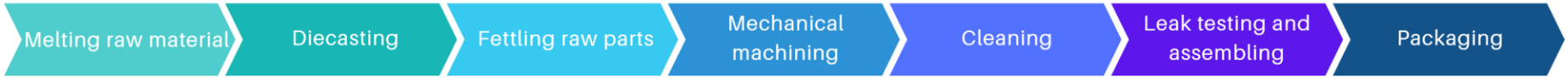
manifold is simply mounted. The carboard packaging is recycled, the plastic packaging is incinerated with energy recovery. EUR-pallets are reused multiple times to transport new goods but in this EPD it is conservatively assumed that EUR-pallets are re-used just once.

PRODUCT USE AND MAINTENANCE (B1-B7)

The use phase is not declared in this EPD.
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

The manifolds stay in the building for the full lifecycle of the building itself. When the building is demolished the fittings could still be used, but in this EPD it is conservatively assumed that they are recycled.
C1 - Deconstruction
The removal of the fittings is done by hand with only manual tools. The dismounting does not require energy nor resources.
C2 - Transport to waste processing
The distance to transport the end-of-life product form the deconstruction site to the closest facility is assumed to be 100 km and the transport by lorry.
C3 - Waste processing for reuse, recovery and/or recycling
According to the World Steel Association 95% of the metal in the fitting is recycled.
C4 - Disposal
The remaining 5% of metal fitting and the non-metal part (represented by gasket) are landfilled.
D - Benefits and loads beyond the system boundary
Due to the waste recycling and incineration with energy recovery associated to the waste generated during the product lifecycle some environmental benefits and loads are generated and taken into account in module D. Recycled material is generated from product end-of-life metals and cardboard/wood packaging during installation (A5) and waste processing (C3). Electrical energy and heat are generated during the incineration of plastic packaging generated during installation (A5).


Melting raw material
Diecasting
Fettling raw parts
Mechanical machining
Cleaning
Leak testing and assembling
Packaging

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

AVERAGES AND VARIABILITY

Type of average	Multiple products
Averaging method	Averaged by shares of total mass
Variation in GWP-fossil for A1-A3	-5,61% / +4,75%

The results of the EPD refers to a product with average composition that represent the following products:
d12, double, 1-fold
d16, double, 1-fold
d12, double, 2-fold
d16, double, 2-fold
d12, single, 1-fold
d16, single, 1-fold
d20, single, 1-fold
d12, single, 2-fold
d16, single, 2-fold
d20, single, 2-fold
d12, single, 3-fold
d16, single, 3-fold
d20, single, 3-fold

The variants of the products differ mainly in the number of outlets (branching off from the drinking water collector) and their diameter (pipe dimension to be connected); these result in different external dimensions and weights, but no variants in the structural design. The composition per kg remains the same. For the processor, these variants are visible through the product features integrated in the cast metal and the packaging marking (label), and these variants are also clearly visually recognizable.

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	9,55E+00	6,69E-02	2,40E-01	9,86E+00	1,64E-01	2,78E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	9,39E-03	-1,80E-02	-1,76E-03	-8,77E-01
GWP – fossil	kg CO_2e	9,49E+00	6,69E-02	3,67E-01	9,93E+00	1,64E-01	6,94E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	9,38E-03	2,07E-02	2,84E-04	-8,69E-01
GWP – biogenic	kg CO_2e	4,10E-02	0,00E+00	-1,27E-01	-8,65E-02	0,00E+00	2,08E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,63E-06	-3,88E-02	-2,05E-03	-9,86E-03
GWP – LULUC	kg CO_2e	1,86E-02	2,41E-05	2,68E-04	1,88E-02	5,88E-05	1,44E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,46E-06	2,72E-05	2,69E-07	1,10E-03
Ozone depletion pot.	kg $CFC\text{-}_{11}$e	5,32E-07	1,60E-08	6,33E-08	6,12E-07	3,90E-08	1,76E-09	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,16E-09	2,56E-09	1,15E-10	-2,61E-08
Acidification potential	mol H^+e	7,17E-01	2,79E-04	1,53E-03	7,19E-01	6,82E-04	6,59E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,97E-05	2,63E-04	2,67E-06	-3,41E-03
EP-freshwater[2)]	kg Pe	3,15E-03	4,58E-07	1,01E-05	3,16E-03	1,12E-06	1,07E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	7,68E-08	1,11E-06	2,98E-09	-9,17E-06
EP-marine	kg Ne	3,45E-02	8,45E-05	3,87E-04	3,50E-02	2,07E-04	4,90E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,18E-05	5,56E-05	9,26E-07	-6,21E-05
EP-terrestrial	mol Ne	5,02E-01	9,32E-04	3,74E-03	5,07E-01	2,28E-03	2,16E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,30E-04	6,43E-04	1,02E-05	-9,32E-03
POCP ("smog")[3)]	kg NMVOCe	1,37E-01	3,00E-04	2,55E-03	1,40E-01	7,33E-04	4,07E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,17E-05	1,77E-04	2,96E-06	-5,02E-03
ADP-minerals & metals[4)]	kg Sbe	1,87E-02	1,57E-07	2,73E-06	1,87E-02	3,84E-07	7,26E-08	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,20E-08	2,79E-06	6,53E-10	-2,66E-05
ADP-fossil resources	MJ	1,16E+02	1,02E+00	5,75E+00	1,22E+02	2,50E+00	2,15E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,41E-01	2,81E-01	7,80E-03	-7,35E+00
Water use[5)]	m^3e depr.	8,40E+00	4,73E-03	4,06E+00	1,25E+01	1,15E-02	9,60E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,31E-04	5,45E-03	2,47E-05	3,59E-01

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	1,66E-06	7,87E-09	1,62E-08	1,68E-06	1,92E-08	6,11E-10	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,08E-09	3,44E-09	5,39E-11	-3,11E-08
Ionizing radiation[6]	kBq U235e	1,08E+00	5,28E-03	3,04E-02	1,11E+00	1,29E-02	1,17E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,71E-04	3,13E-03	3,53E-05	7,19E-03
Ecotoxicity (freshwater)	CTUe	6,58E+03	8,51E-01	5,97E+00	6,59E+03	2,08E+00	3,32E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,27E-01	1,27E+00	5,09E-03	-1,96E+01
Human toxicity, cancer	CTUh	1,33E-07	2,25E-11	3,14E-10	1,34E-07	5,49E-11	8,58E-12	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,11E-12	3,90E-11	1,27E-13	8,69E-09
Human tox. non-cancer	CTUh	9,52E-06	9,01E-10	3,93E-09	9,52E-06	2,20E-09	2,30E-10	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,25E-10	1,74E-09	3,33E-12	5,22E-08
SQP[7]	-	2,37E+02	1,19E+00	1,37E+01	2,52E+02	2,92E+00	1,01E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,62E-01	5,65E-01	1,67E-02	-1,38E+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	3,18E+01	1,33E-02	1,34E+01	4,53E+01	3,24E-02	3,32E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,59E-03	4,98E-02	6,77E-05	-1,83E+00
Renew. PER as material	MJ	0,00E+00	0,00E+00	1,14E+00	1,14E+00	0,00E+00	-1,93E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,10E-03
Total use of renew. PER	MJ	3,18E+01	1,33E-02	1,45E+01	4,64E+01	3,24E-02	-1,90E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,59E-03	4,98E-02	6,77E-05	-1,83E+00
Non-re. PER as energy	MJ	1,16E+02	1,02E+00	4,68E+00	1,21E+02	2,50E+00	2,15E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,41E-01	2,81E-01	7,80E-03	-7,30E+00
Non-re. PER as material	MJ	1,08E-01	0,00E+00	8,01E-01	9,10E-01	0,00E+00	-2,35E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-1,03E-01	-5,42E-03	1,23E-04
Total use of non-re. PER	MJ	1,16E+02	1,02E+00	5,48E+00	1,22E+02	2,50E+00	-2,14E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,41E-01	1,78E-01	2,38E-03	-7,30E+00
Secondary materials	kg	4,62E-01	2,89E-04	4,55E-03	4,67E-01	7,05E-04	2,71E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,91E-05	3,12E-04	1,64E-06	6,08E-01
Renew. secondary fuels	MJ	7,03E-03	2,55E-06	2,74E-02	3,44E-02	6,22E-06	2,18E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,95E-07	1,63E-05	4,28E-08	-2,67E-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	2,87E-01	1,36E-04	9,53E-02	3,83E-01	3,32E-04	2,00E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,83E-05	1,65E-04	8,54E-06	-2,36E-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	3,09E+00	1,10E-03	1,82E-02	3,11E+00	2,68E-03	6,55E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,87E-04	1,91E-03	0,00E+00	-5,27E-01
Non-hazardous waste	kg	2,08E+02	1,91E-02	3,13E-01	2,08E+02	4,67E-02	4,15E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,07E-03	6,09E-02	5,40E-02	-1,84E+00
Radioactive waste	kg	4,00E-04	7,06E-06	2,93E-05	4,37E-04	1,73E-05	4,08E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	9,43E-07	1,64E-06	0,00E+00	-7,04E-07

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	3,36E+00	3,36E+00	0,00E+00	6,30E-02	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	1,07E+00	1,07E+00	0,00E+00	2,47E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	9,46E-01	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	6,29E-03	6,29E-03	0,00E+00	1,80E-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	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,43E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+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
16.04.2025

VERIFIED ISO 14025