ENVIRONMENTAL PRODUCT DECLARATION

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

STEEL STRUCTURES

AS UPB

EPD HUB, HUB-1364
Published on 03.05.2024, last updated on 03.05.2024, valid until 03.05.2029.

GENERAL INFORMATION

MANUFACTURER

Manufacturer	RK metāls
Address	Lauktehnikas street 12, Grobiņa, Latvia, LV3430
Contact details	rkmetals@rkmetals.lv
Website	https://www.rkmetals.lv/

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 1.0, 1 Feb 2022
Sector	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with modules A4, A5, C1-C4, D
EPD author	AS UPB, Dzintaru street 17, Liepaja, Latvia
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ 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	Steel structures
Additional labels	-
Product reference	-
Place of production	Grobiņa, Latvia
Period for data	2023
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	-

ENVIRONMENTAL DATA SUMMARY

Declared unit	1t
Declared unit mass	1000 kg
GWP-fossil, A1-A3 (kgCO2e)	1160
GWP-total, A1-A3 (kgCO2e)	1160
Secondary material, inputs (%)	81.66
Secondary material, outputs (%)	85
Total energy use, A1-A3 (kWh)	5360
Total water use, A1-A3 (m3e)	14.1

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

RK Metāls group is one of the largest manufacturers of steel building structures and products of machinery solutions in the Baltics. The main areas of activities include steel structures, steel design, machinery solutions, project development, production, installation and logistics. European certificates in stainless steel and aluminium processing confirm the high quality standards maintained at RK Metāls.

Quality and Environment Management system of the company is certified according to the requirements of the international standards ISO 9001 and ISO 14001. HSE processes are managed according to the requirements of the international standard ISO 45001.

PRODUCT DESCRIPTION

Steel structures for buildings, bridges and machines.
Further information can be found at https://www.rkmetals.lv/.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	100	Europe
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

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 ton
Mass per declared unit	1000 kg
Functional unit	-
Reference service life	-

SUBSTANCES, REACH - VERY HIGH CONCERN

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

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production 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.

Materials are purchased according to project specification and transported to factory. When materials have arrived then starts production processes which might consist of: Sawing, plasma cutting, assembling, welding, shot blasting, coating and storing. Afterwards goods are ready to be transported to site. Steel waste in factory is sent for recycling. Possible variations are shown in flow chart. Packaging materials are not used. Goods are fixed with lanyards on truck.

The ready product does not cause any indoor air emissions.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction sites (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions. Transportation from the manufacturing plants to the building site has been calculated using a most likely scenario for the export of the declared unit to Sweden by a lorry and by a ferry. The average distance of transportation from both production plants to construction site is assumed as 270 km by ferry and 180 km by lorry. Scenario (A5) is modelled as installation of a typical steel structures in a building - fossil fuel for building machinery. The energy consumption of the installation process is on average 10 kWh/m2

PRODUCT USE AND MAINTENANCE (B1-B7)

The modules B1-B7 have not been calculated nor included in the LCA calculations as that is not mandatory for this LCA report.

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

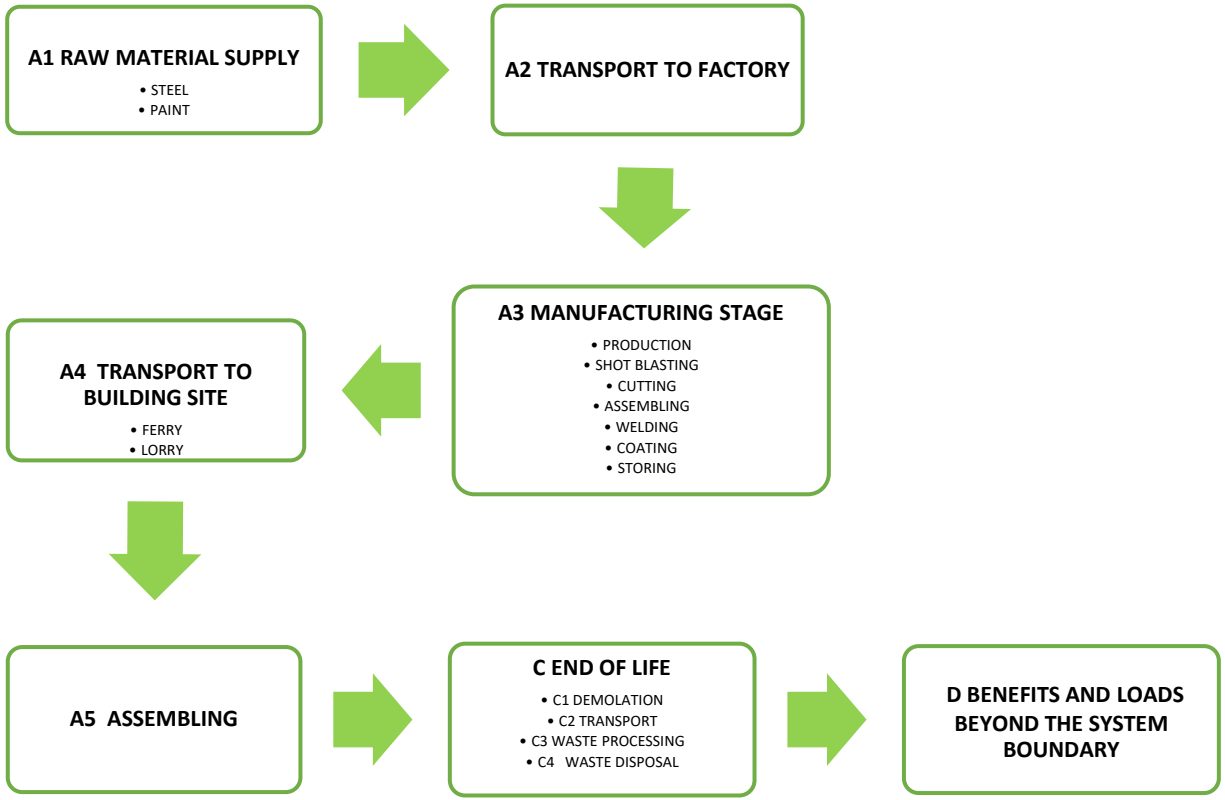
PRODUCT END OF LIFE (C1-C4, D)

Consumption of energy in demolition process assumed from industry average. The energy consumption of the demolition process is on average 10 kWh/m2 (Bozdag, Ö. & Secer, M. 2007). Distance for transportation to treatment (C2) is assumed to be 50 km. This is an average distance which considers the fact that according to the markets where the Products are used.

According to European Waste Framework Directive (2008/98/EC) Waste Hierarchy stated that if waste formation cannot be prevented, waste should be reused, recycled or otherwise recovered e.g. through energy recovery. Landfilling is to be avoided in all cases. As per the Directive, the products should not be landfilled, as recycling is the most conservative waste treatment scenario for the most components used in the product.

It is assumed that overall steel recycling rate average is 85% (Dr. Chris Bataille Associate Researcher, IDDRI & Adjunct Professor, Simon Fraser University, Low and zero emissions in the steel and cement industries). The process losses of the waste treatment plant are assumed to be negligible. The remaining 15% of steel are assumed to be send to the landfill. Benefits of recyclable waste generated in the phase C3 are taken into account in the phase D. The recycled steel has been modelled to avoid use of primary materials. The scrap content in the studied product has been acknowledged and only the mass of primary steel in the product provides the benefit in order to avoid double counting.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

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

As paint weight in finished steel structures is less than 0,4 % it was not included in calculations.

The modules B1-B7 have not been calculated nor included in the LCA calculations as that is not mandatory for this LCA report.

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

AVERAGES AND VARIABILITY

Type of average	No averaging
Averaging method	-
Variation in GWP-fossil for A1-A3	-

In calculation was used raw material data from 2023.

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	9,38E+02	1,82E+02	3,85E+01	1,16E+03	2,01E+01	3,31E+00	MND	MND	MND	MND	MND	MND	MND	3,31E+00	4,40E+00	1,86E+01	7,91E-01	-3,94E+01
GWP – fossil	kg CO_2e	9,37E+02	1,82E+02	3,85E+01	1,16E+03	2,01E+01	3,31E+00	MND	MND	MND	MND	MND	MND	MND	3,31E+00	4,40E+00	1,86E+01	7,90E-01	-3,94E+01
GWP – biogenic	kg CO_2e	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
GWP – LULUC	kg CO_2e	9,72E-01	6,84E-02	6,02E-03	1,05E+00	1,14E-02	3,30E-04	MND	MND	MND	MND	MND	MND	MND	3,30E-04	1,65E-03	2,44E-02	7,46E-04	3,64E-03
Ozone depletion pot.	kg CFC_{-11}e	4,92E-05	4,55E-05	5,61E-06	1,00E-04	4,32E-06	7,07E-07	MND	MND	MND	MND	MND	MND	MND	7,07E-07	1,08E-06	2,30E-06	3,20E-07	-1,41E-06
Acidification potential	mol H^+e	3,68E+00	5,81E-01	5,60E-02	4,32E+00	4,73E-01	3,44E-02	MND	MND	MND	MND	MND	MND	MND	3,44E-02	1,48E-02	2,36E-01	7,43E-03	-1,25E-01
EP-freshwater[2)]	kg Pe	7,97E-01	1,30E-03	2,64E-04	7,99E-01	9,06E-05	1,10E-05	MND	MND	MND	MND	MND	MND	MND	1,10E-05	3,22E-05	9,98E-04	8,28E-06	-1,65E-03
EP-marine	kg Ne	8,06E-01	1,28E-01	1,53E-02	9,50E-01	1,17E-01	1,52E-02	MND	MND	MND	MND	MND	MND	MND	1,52E-02	3,49E-03	4,99E-02	2,57E-03	-2,97E-02
EP-terrestrial	mol Ne	8,25E+00	1,42E+00	1,67E-01	9,84E+00	1,31E+00	1,67E-01	MND	MND	MND	MND	MND	MND	MND	1,67E-01	3,86E-02	5,77E-01	2,83E-02	-3,49E-01
POCP ("smog")[3)]	kg NMVOCe	2,63E+00	5,60E-01	5,68E-02	3,25E+00	3,43E-01	4,59E-02	MND	MND	MND	MND	MND	MND	MND	4,59E-02	1,45E-02	1,59E-01	8,23E-03	-2,19E-01
ADP-minerals & metals[4)]	kg Sbe	3,07E+02	4,47E-04	4,92E-05	3,07E+02	3,26E-05	1,68E-06	MND	MND	MND	MND	MND	MND	MND	1,68E-06	1,07E-05	2,51E-03	1,82E-06	-5,01E-06
ADP-fossil resources	MJ	1,27E+04	2,91E+03	6,29E+02	1,62E+04	2,74E+02	4,45E+01	MND	MND	MND	MND	MND	MND	MND	4,45E+01	6,96E+01	2,52E+02	2,17E+01	-3,10E+02
Water use[5)]	m^3e depr.	3,42E+02	1,34E+01	3,65E+00	3,60E+02	9,43E-01	1,20E-01	MND	MND	MND	MND	MND	MND	MND	1,20E-01	3,20E-01	4,89E+00	6,87E-02	-6,06E+00

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	1,08E-05	2,12E-05	1,13E-06	3,30E-05	1,15E-06	9,22E-07	MND	MND	MND	MND	MND	MND	MND	9,22E-07	5,10E-07	3,09E-06	1,50E-07	-2,16E-06
Ionizing radiation[6)]	kBq U235e	6,72E+00	1,50E+01	1,04E+00	2,28E+01	1,31E+00	2,05E-01	MND	MND	MND	MND	MND	MND	MND	2,05E-01	3,55E-01	2,81E+00	9,80E-02	2,80E+00
Ecotoxicity (freshwater)	CTUe	2,98E+03	2,42E+03	1,46E+02	5,55E+03	1,91E+02	2,68E+01	MND	MND	MND	MND	MND	MND	MND	2,68E+01	5,86E+01	1,14E+03	1,41E+01	-1,27E+03
Human toxicity, cancer	CTUh	1,45E-06	6,30E-08	6,66E-08	1,58E-06	9,86E-09	1,03E-09	MND	MND	MND	MND	MND	MND	MND	1,03E-09	1,51E-09	3,50E-08	3,53E-10	5,49E-07
Human tox. non-cancer	CTUh	2,87E-06	2,47E-06	1,47E-07	5,48E-06	1,53E-07	1,94E-08	MND	MND	MND	MND	MND	MND	MND	1,94E-08	5,94E-08	1,56E-06	9,24E-09	-7,88E-07
SQP[7)]	-	5,51E+02	3,39E+03	3,00E+01	3,97E+03	1,40E+02	5,79E+00	MND	MND	MND	MND	MND	MND	MND	5,79E+00	8,10E+01	5,08E+02	4,63E+01	-5,94E+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	3,22E+03	3,77E+01	8,83E+02	4,14E+03	2,41E+00	2,54E-01	MND	MND	MND	MND	MND	MND	MND	2,54E-01	8,84E-01	4,47E+01	1,88E-01	1,42E+01
Renew. PER as material	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
Total use of renew. PER	MJ	3,22E+03	3,77E+01	8,83E+02	4,14E+03	2,41E+00	2,54E-01	MND	MND	MND	MND	MND	MND	MND	2,54E-01	8,84E-01	4,47E+01	1,88E-01	1,42E+01
Non-re. PER as energy	MJ	1,26E+04	2,91E+03	6,29E+02	1,62E+04	2,74E+02	4,45E+01	MND	MND	MND	MND	MND	MND	MND	4,45E+01	6,96E+01	2,52E+02	2,17E+01	-3,11E+02
Non-re. PER as material	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
Total use of non-re. PER	MJ	1,26E+04	2,91E+03	6,29E+02	1,62E+04	2,74E+02	4,45E+01	MND	MND	MND	MND	MND	MND	MND	4,45E+01	6,96E+01	2,52E+02	2,17E+01	-3,11E+02
Secondary materials	kg	1,18E+03	8,21E-01	8,40E+01	1,27E+03	1,00E-01	1,74E-02	MND	MND	MND	MND	MND	MND	MND	1,74E-02	1,96E-02	2,81E-01	4,55E-03	3,00E+01
Renew. secondary fuels	MJ	2,82E-03	7,24E-03	3,80E-04	1,04E-02	4,48E-04	5,70E-05	MND	MND	MND	MND	MND	MND	MND	5,70E-05	1,76E-04	1,46E-02	1,19E-04	1,40E-03
Non-ren. secondary fuels	MJ	3,60E-20	0,00E+00	0,00E+00	3,60E-20	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	1,36E+01	3,86E-01	8,62E-02	1,41E+01	2,37E-02	2,70E-03	MND	MND	MND	MND	MND	MND	MND	2,70E-03	9,20E-03	1,48E-01	2,37E-02	-1,24E-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	2,66E+00	3,12E+00	1,18E+00	6,96E+00	3,26E-01	5,96E-02	MND	MND	MND	MND	MND	MND	MND	5,96E-02	7,73E-02	1,71E+00	0,00E+00	2,18E+00
Non-hazardous waste	kg	1,74E+02	5,43E+01	1,12E+01	2,40E+02	3,66E+00	4,19E-01	MND	MND	MND	MND	MND	MND	MND	4,19E-01	1,33E+00	5,47E+01	1,50E+02	-5,79E+01
Radioactive waste	kg	1,02E+00	2,01E-02	6,41E-04	1,04E+00	1,92E-03	3,13E-04	MND	MND	MND	MND	MND	MND	MND	3,13E-04	4,78E-04	1,48E-03	0,00E+00	5,15E-04

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	2,13E+00	0,00E+00	0,00E+00	2,13E+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	4,30E+01	0,00E+00	8,35E+01	1,26E+02	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	8,50E+02	0,00E+00	0,00E+00
Materials for energy rec	kg	4,24E-02	0,00E+00	0,00E+00	4,24E-02	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	2,15E+00	0,00E+00	0,00E+00	2,15E+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

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
03.05.2024

VERIFIED ISO 14025