

ENVIRONMENTAL PRODUCT DECLARATION

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

Steel Panel Radiators Purmo Radson Thermopanel
Purmo Group Plc



EPD HUB, HUB-1251

Publishing date 22 March 2024, last updated on 22 March 2024, valid until 22 March 2029.

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Purmo Group Plc
Address	46 Bulevardi, P.O. Box 115, FI-00121 Helsinki, Finland
Contact details	info@purmogroup.com
Website	www.purmogroup.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 1.0, 1 Feb 2022
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	Roman Strzelczyk, Purmo Group Poland
EPD verification	Independent verification of this EPD and data, according to ISO 14025: <input type="checkbox"/> Internal verification <input checked="" type="checkbox"/> External verification
EPD verifier	Magaly González Vázquez, 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 Panel Radiators Purmo Radson Thermopanel
Additional labels	-
Product reference	Purmo, Radson, Thermopanel
Place of production	Rybnik, Poland
Period for data	Calendar year 2022
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	%

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg
Declared unit mass	1 kg
GWP-fossil, A1-A3 (kgCO ₂ e)	2,83E+00
GWP-total, A1-A3 (kgCO ₂ e)	2,80E+00
Secondary material, inputs (%)	22.2
Secondary material, outputs (%)	81.3
Total energy use, A1-A3 (kWh)	9.56
Total water use, A1-A3 (m ³ e)	0.03

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Over 3,000 professionals operate in Purmo Group through 24 countries, manufacturing, selling and distributing to customers in more than 100 countries around the world. Our headquarters is in Helsinki, Finland.

Our operations are run through two divisions: Climate Solutions Division and Climate Product and Systems Division.

More info at: www.purmogroup.com

PRODUCT DESCRIPTION

Panel radiators are made of low-alloyed, cold rolled steel sheets with surface coated in polyester-epoxy resin powder. Steel panel radiators are intended to use in heating systems of buildings to deliver heat securing optimal indoor climate comfort. The radiators fulfil requirements of placing the products on the markets according to Regulation (EU) No 305/2011 (CPR). The required declarations of performance and CE marking have been prepared in accordance with the harmonised standards: EN 442-1:2014 - Radiators and convectors - part 1: Technical specifications and requirements and EN 442-2:2014 - Radiators and convectors - part 2: Test methods and performance specifications. Their essential characteristics values are provided in a form of individual Declaration of Performance according to EN-442 standard.

Further information can be found at www.purmogroup.com.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	98	Europe
Minerals	-	-
Fossil materials	2	Europe
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	0.015

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	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 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.

Manufacturing of hydronic panel radiators from cold rolled steel coils. Main processes flow during production: pressing, welding, testing, painting, packaging. All components consumption declared in mass unit [kg]. Transportation distances for raw materials, packaging components, ancillary materials using during manufacturing process have been calculated as distances from suppliers warehouses to production site.

Relevant manufacturing wastes (e.g. steel scraw) and their proper Eol scenarios have been included. Less relevant production wastes have been excluded from calculation accordingly to allowed cut-off criteria.

Heat, electricity consumption for processes at the factory are calculated in MJ or kWh with allocation by mass 1 kg of product.

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.

Products with unit packaging are transported to the customers on wooden pallets, mainly by lorries. Average distance covered by finished product to construction site has been given as calculated average distance to customer warehouse (972 km) + estimated value of 50 km to construction site what gives total distance 1022 km. Energy for diesel machinery during installation estimated as 0,01 kWh per 1 kg of product. During installation packaging is wasting. Based on EU reports it has been assumed that: 70,5% of paperboard and paper goes for recycling, 14,5% for incineration and 15% is landfilled. In case of PE it has been assumed that 32,5% goes for recycling, 42,6% for incineration and 24,9% for landfill.

PRODUCT USE AND MAINTENANCE (B1-B7)

Not concerned.

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

PRODUCT END OF LIFE (C1-C4, D)

According to World Steel Association report 85% of steel is assumed to be recycled. The rest 15% is landfilled.

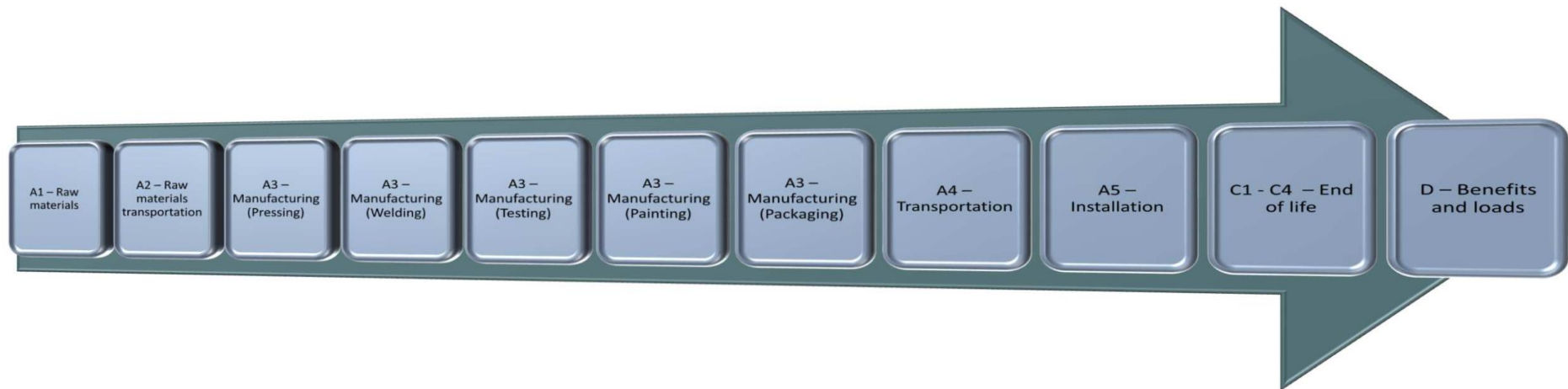
The paint is assumed to be fully landfilled.

Consumption of energy during deconstruction is considered as 0,01 kWh per 1kg of product of diesel fuel used by machines.

It is assumed that the wastes are collected separately and transported by lorries to the waste treatment facilities at average distance 50 km.

Module C3 accounts for energy and resources inputs for sorting and treatment steel and brass for recycling and incineration of wood, paperboard and polyethylene with efficiency greater than 60%. Additionally waste that is incinerated without energy recovery or landfilled is included in module C4. Due to material and energy recovery potential of parts in the product and in the packaging, recycled raw materials lead to avoiding virgin material production and the energy recovered from incineration replaces energy and heat from primary sources. Benefits and loads from incineration and recycling are included in module D.

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.

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

AVERAGES AND VARIABILITY

Type of average	No averaging
Averaging method	Not applicable
Variation in GWP-fossil for A1-A3	%

This EPD is product and factory specific and does not contain average calculations.

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 ₂ e	2,28E+00	4,95E-02	4,74E-01	2,80E+00	9,55E-02	7,84E-02	MND	MND	MND	MND	MND	MND	MND	3,13E-03	4,44E-03	3,38E-02	3,10E-03	-1,62E+00
GWP – fossil	kg CO ₂ e	2,25E+00	4,95E-02	5,30E-01	2,83E+00	9,54E-02	2,12E-02	MND	MND	MND	MND	MND	MND	MND	3,13E-03	4,43E-03	3,37E-02	3,10E-03	-1,61E+00
GWP – biogenic	kg CO ₂ e	-1,13E-03	2,45E-08	-5,60E-02	-5,71E-02	0,00E+00	5,71E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,23E-02
GWP – LULUC	kg CO ₂ e	2,97E-02	2,99E-05	3,22E-04	3,01E-02	3,71E-05	6,92E-06	MND	MND	MND	MND	MND	MND	MND	3,11E-07	1,72E-06	2,37E-05	9,64E-07	-3,65E-04
Ozone depletion pot.	kg CFC ₁₁ e	4,38E-07	1,09E-08	1,73E-08	4,66E-07	2,25E-08	3,08E-10	MND	MND	MND	MND	MND	MND	MND	6,69E-10	1,04E-09	2,21E-09	3,68E-10	-6,45E-08
Acidification potential	mol H ⁺ e	1,12E-02	1,62E-04	3,19E-03	1,45E-02	3,11E-04	3,12E-05	MND	MND	MND	MND	MND	MND	MND	3,25E-05	1,46E-05	2,28E-04	9,10E-06	-7,39E-03
EP-freshwater ²⁾	kg Pe	1,12E-04	5,43E-07	5,54E-05	1,68E-04	8,09E-07	5,32E-07	MND	MND	MND	MND	MND	MND	MND	1,04E-08	3,76E-08	9,61E-07	1,34E-08	-7,68E-05
EP-marine	kg Ne	1,98E-03	3,50E-05	4,00E-04	2,42E-03	6,83E-05	6,23E-06	MND	MND	MND	MND	MND	MND	MND	1,44E-05	3,23E-06	4,89E-05	6,98E-06	-1,34E-03
EP-terrestrial	mol Ne	2,22E-02	3,88E-04	4,34E-03	2,69E-02	7,58E-04	6,58E-05	MND	MND	MND	MND	MND	MND	MND	1,58E-04	3,59E-05	5,64E-04	3,40E-05	-1,57E-02
POCP (“smog”) ³⁾	kg NMVOCe	1,02E-02	1,46E-04	1,31E-03	1,16E-02	2,94E-04	1,79E-05	MND	MND	MND	MND	MND	MND	MND	4,34E-05	1,38E-05	1,55E-04	1,10E-05	-7,30E-03
ADP-minerals & metals ⁴⁾	kg Sbe	5,35E-05	1,49E-07	9,26E-07	5,45E-05	2,32E-07	4,44E-08	MND	MND	MND	MND	MND	MND	MND	1,59E-09	1,08E-08	2,38E-06	2,53E-09	-2,50E-05
ADP-fossil resources	MJ	2,42E+01	7,52E-01	6,85E+00	3,18E+01	1,50E+00	9,31E-02	MND	MND	MND	MND	MND	MND	MND	4,21E-02	6,94E-02	2,44E-01	2,57E-02	-1,48E+01
Water use ⁵⁾	m ³ e depr.	9,20E-01	4,36E-03	1,34E-01	1,06E+00	6,67E-03	3,57E-03	MND	MND	MND	MND	MND	MND	MND	1,13E-04	3,10E-04	5,31E-03	9,94E-05	-2,72E-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	1,59E-07	4,97E-09	1,11E-08	1,75E-07	1,09E-08	2,37E-10	MND	MND	MND	MND	MND	MND	MND	8,71E-10	5,04E-10	2,97E-09	1,79E-10	-1,05E-07
Ionizing radiation ⁶⁾	kBq U235e	1,37E-01	3,89E-03	1,94E-02	1,60E-01	7,16E-03	2,05E-03	MND	MND	MND	MND	MND	MND	MND	1,93E-04	3,32E-04	2,71E-03	1,20E-04	2,48E-02
Ecotoxicity (freshwater)	CTUe	7,75E+01	6,95E-01	6,79E+00	8,50E+01	1,33E+00	1,13E-01	MND	MND	MND	MND	MND	MND	MND	2,53E-02	6,17E-02	1,10E+00	3,19E-02	-5,25E+01
Human toxicity, cancer	CTUh	1,33E-08	2,04E-11	2,08E-10	1,35E-08	3,25E-11	4,95E-12	MND	MND	MND	MND	MND	MND	MND	9,69E-13	1,51E-12	3,52E-11	6,15E-13	1,09E-08
Human tox. non-cancer	CTUh	6,78E-08	6,48E-10	7,63E-09	7,61E-08	1,28E-09	1,40E-10	MND	MND	MND	MND	MND	MND	MND	1,83E-11	5,95E-11	1,52E-09	1,61E-11	-3,42E-08
SQP ⁷⁾	-	9,04E+00	7,56E-01	6,69E+00	1,65E+01	1,72E+00	2,36E-02	MND	MND	MND	MND	MND	MND	MND	5,47E-03	7,98E-02	4,85E-01	5,60E-02	-6,07E+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	2,26E+00	1,37E-02	9,39E-01	3,21E+00	1,68E-02	1,51E-02	MND	MND	MND	MND	MND	MND	MND	2,40E-04	7,81E-04	4,28E-02	2,99E-04	-1,53E+00
Renew. PER as material	MJ	1,05E-01	0,00E+00	4,81E-01	5,86E-01	0,00E+00	-4,91E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	-9,53E-02	1,30E-01
Total use of renew. PER	MJ	2,36E+00	1,37E-02	1,42E+00	3,79E+00	1,68E-02	-4,75E-01	MND	MND	MND	MND	MND	MND	MND	2,40E-04	7,81E-04	4,28E-02	-9,50E-02	-1,40E+00
Non-re. PER as energy	MJ	2,41E+01	7,52E-01	6,33E+00	3,12E+01	1,50E+00	9,31E-02	MND	MND	MND	MND	MND	MND	MND	4,21E-02	6,94E-02	2,44E-01	2,57E-02	-1,46E+01
Non-re. PER as material	MJ	7,37E-02	0,00E+00	5,10E-01	5,83E-01	0,00E+00	-5,16E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	-6,70E-02	1,63E-01
Total use of non-re. PER	MJ	2,42E+01	7,52E-01	6,84E+00	3,18E+01	1,50E+00	-4,23E-01	MND	MND	MND	MND	MND	MND	MND	4,21E-02	6,94E-02	2,44E-01	-4,13E-02	-1,45E+01
Secondary materials	kg	2,22E-01	2,81E-04	1,65E-02	2,39E-01	4,14E-04	3,39E-05	MND	MND	MND	MND	MND	MND	MND	1,65E-05	1,92E-05	2,85E-04	6,15E-06	7,51E-01
Renew. secondary fuels	MJ	2,06E-04	2,58E-06	6,77E-03	6,98E-03	4,18E-06	2,48E-07	MND	MND	MND	MND	MND	MND	MND	5,38E-08	1,94E-07	1,39E-05	1,78E-07	-1,22E-04
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	2,12E-02	1,19E-04	1,31E-02	3,44E-02	1,93E-04	7,02E-05	MND	MND	MND	MND	MND	MND	MND	2,56E-06	8,96E-06	1,45E-04	2,79E-05	-5,05E-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	7,77E-01	1,25E-03	4,90E-02	8,27E-01	1,97E-03	3,69E-04	MND	MND	MND	MND	MND	MND	MND	5,63E-05	9,14E-05	1,74E-03	2,72E-06	-4,57E-01
Non-hazardous waste	kg	4,81E+00	2,22E-02	2,39E+00	7,23E+00	3,23E-02	5,06E-02	MND	MND	MND	MND	MND	MND	MND	3,96E-04	1,50E-03	5,80E-02	1,61E-01	-3,55E+00
Radioactive waste	kg	5,56E-05	4,96E-06	6,86E-06	6,74E-05	1,01E-05	5,93E-07	MND	MND	MND	MND	MND	MND	MND	2,96E-07	4,67E-07	1,41E-06	3,28E-09	-6,82E-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	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	0,00E+00	0,00E+00	0,00E+00	1,20E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	8,16E-01	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	5,03E-03	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	2,10E-03	2,10E-03	0,00E+00	3,69E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	1,75E-01	0,00E+00	0,00E+00

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / 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 ₂ e	2,18E+00	4,90E-02	5,20E-01	2,75E+00	9,45E-02	2,13E-02	MND	MND	MND	MND	MND	MND	MND	3,09E-03	4,39E-03	3,35E-02	4,46E-03	-1,54E+00
Ozone depletion Pot.	kg CFC ₁₁ e	5,47E-07	8,61E-09	1,46E-08	5,70E-07	1,78E-08	2,63E-10	MND	MND	MND	MND	MND	MND	MND	5,29E-10	8,26E-10	1,79E-09	2,92E-10	-6,78E-08
Acidification	kg SO ₂ e	9,22E-03	1,32E-04	2,72E-03	1,21E-02	2,52E-04	2,57E-05	MND	MND	MND	MND	MND	MND	MND	2,32E-05	1,18E-05	1,84E-04	6,90E-06	-6,07E-03
Eutrophication	kg PO ₄ ³ e	4,77E-03	3,20E-05	1,77E-03	6,57E-03	5,51E-05	4,31E-05	MND	MND	MND	MND	MND	MND	MND	5,37E-06	2,58E-06	6,42E-05	9,56E-05	-3,04E-03
POCP ("smog")	kg C ₂ H ₄ e	1,14E-03	6,29E-06	1,28E-04	1,27E-03	1,16E-05	1,22E-06	MND	MND	MND	MND	MND	MND	MND	5,07E-07	5,41E-07	7,01E-06	9,67E-07	-8,20E-04
ADP-elements	kg Sbe	5,32E-05	1,45E-07	9,14E-07	5,43E-05	2,26E-07	4,41E-08	MND	MND	MND	MND	MND	MND	MND	1,56E-09	1,05E-08	2,38E-06	2,48E-09	-2,49E-05
ADP-fossil	MJ	2,42E+01	7,52E-01	6,85E+00	3,18E+01	1,50E+00	9,31E-02	MND	MND	MND	MND	MND	MND	MND	4,21E-02	6,94E-02	2,44E-01	2,57E-02	-1,48E+01

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 compliance 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.

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

22.03.2024

