Programme	Programme operator	EPD registration No	Publication date	Revision date	Valid until
The International EPD® System, www.environdec.com	EPD International AB	S-P-06929	2022-09-23	2023-09-15	2027-09-22

Environmental Product Declaration

LSAW Steel Pipes

In accordance with ISO 14025 and EN 15804:2012+A2:2019

A note that an EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at http://www.environdec.com

CORINTH PIPEWORKS

Member of CENERGY HOLDINGS

EPD VERIFIED

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Program related information

CPC Code:
4128 Tubes, pipes and hollow profiles, of steel

The CEN standard EN 15804
serves as the core Product Category Rules PCR 2019:14, version v.1.11 'Construction products'

PCR review was conducted by:
The Technical Committee of the International EPD System

Independent third-party verification of the declaration and data, according to ISO 14025:2006

☐ EPD process certification ☒ EPD verification

Procedure for follow-up during EPD validity involves third party verifier

☒ Yes ☐ No

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The EPD owner has the sole ownership, liability, and responsibility for the EPD.
EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.
For further information about comparability, see EN 15804 and ISO 14025.

Company Information

At a glance

Corinth Pipeworks is one of the leading manufacturers of steel pipes and hollow sections, worldwide, for the energy and construction sectors.

With a successful course and experience of over half a century, it has implemented very demanding projects with leading energy companies worldwide.

We are ready for the energy transition, we are committed to contributing positively to the energy transition and tackling climate change through new technological solutions that allow the increasing use of renewable sources in the energy mix, through the development of innovative products and reducing our carbon footprint. With over half a century of experience, Corinth Pipeworks has collaborated with major energy companies around the world, in extremely demanding projects.

The customer-centric philosophy of the Company has brought about strong, long-term and mutually beneficial relationships, strengthening its geographical presence. The plant is located in the Industrial Area of Thisvi in the Prefecture of Viotia, Greece and is considered to be one of the most modern steel pipe manufacturing mills, worldwide. For Corinth Pipeworks product quality assurance is a matter for all those involved in the process. It capitalizes the active participation of the management, the employees, the suppliers and even the customers and creates a sense of trust among shareholders. The company's Quality policy includes all those methods and practices that ensure product quality throughout the value chain from design to steel production, investment, storage and disposal. It also includes the collection and evaluation process of information on customer satisfaction in order to constantly improve the methods and practices that follow.

The Company manufactures one of the most complete product ranges in the world and offers complete solutions, which are based on investments in new technologies and the continuous improvement of its production processes.

EPD
ENVIRONMENTAL PRODUCT DECLARATION

CORINTH PIPEWORKS
Member of CENERGY HOLDINGS

Product Information

This is a specific EPD and covers Longitudinal submerged arc-welded steel pipes (LSAW) manufactured in Corinth Pipework's plant.

LSAW steel pipes are divided into three categories:

- Bare LSAW steel pipes
- PE/PP+powder coated LSAW steel pipes
- PE/PP+powder+concrete coated LSAW steel pipes
- Bare & coated structural steel pipes

Corinth Pipeworks offers all sizes and grades of pipe used for onshore gas and liquid fuel pipelines, downstream CO2 reinjection, petrochemical, fuel transportation lines, as well as for structural applications. Pipes are in compliance with all major international standards used for onshore applications such as API 5L, ISO 3183 and CSA Z245.1, supplemented where necessary by additional client specification requirements. Pipes can also be supplied with external anti-corrosion coatings and internal linings such as FBE single and dual layer, three-layer PE/PP and internal epoxy lining for flow efficiency and/or anticorrosion protection. Pipe length can reach 24m and give significant cost benefit in the final laying phase.
All around the world new pipeline projects are being developed offshore, often in very harsh environments involving very low temperatures, sour conditions, or deep-water where pipes require improved collapse resistance. Corinth Pipeworks has specifically developed a range of welded line pipe products to satisfy just such onerous conditions and now have a strong track record of supply for a range of subsea applications including line pipe for subsea-tie backs to existing facilities installed by the reel-lay method, and major export pipelines for new field developments installed by S or J lay. The range of pipe coatings is also tailored to offshore applications, including anti-corrosion coatings such as three-layer polypropylene or polyethylene which also offer physical protection, high performance fusion bonded epoxy coatings, epoxy lining for flow assurance, and concrete coating where needed for negative buoyancy. Manufacturing of high-quality welded pipes and pipe coating is just part of Corinth Pipeworks' capability which also includes a number of unique value adding proposals such as 24m pipe joint capability significantly reducing time and cost for on-site or lay-barge welding and field joint coating. Class leading dimensional tolerances coupled with advanced measuring systems developed in close cooperation with end-users and installation contractors offers a detailed report on of every pipe's dimensional characteristics to give a clear advantage with reduced sorting or manipulation during offshore installation.
At the forefront of technological innovation, Corinth Pipeworks' research and development in the field of hydrogen transportation, through existing or new energy networks, developing technology and new products will enable the clean transformation to a coal-free, clean energy economy. As a result, Corinth Pipeworks is leading the hydrogen era with the first high pressure gas pipeline network, certified to transport up to 100% hydrogen.

Composition

The product consists of 100% of steel plates and coils.
According to the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) Regulation, the product does not contain any substance included in the Candidate List of Substances of Very High Concern (SVHCs) for authorization with concentrations higher than 0.1% weight by weight (w/w).

	Bare LSAW	PE/PP+powder coated LSAW	PE/PP+powder+concrete coated LSAW
Steel	100%	94-96%	68-73%
Polyethylene	-	2-4%	1-3%
Polypropylene	-	<1%	<1%
Concrete	-	-	4-8%
Coating powder	-	<1%	<1%
Blast furnace slag	-	-	18-22%

Packaging

There are no packaging materials used in the final products.

LCA Information

Declared unit

1 metric ton of LSAW steel pipes.
A declared unit based on the mass of the products and not length or area is chosen, since it is the most common unit that clients of Corinth Pipeworks chose to make the orders for these products.

Goal and Scope

This EPD assesses the environmental impact of 1 ton of LSAW steel pipes from cradle to gate with modules C+D.

System Boundaries

Corinth Pipeworks S.A. manufacturing plant, which is placed in the Industrial Zone of Thisvi, Viotia Greece are system's boundaries. The exact geographical coordinates of the plant are 38.23463448912686, 22.954339833150314. System boundaries are set to be cradle to gate (A1-A3) with modules C+D.

Allocations

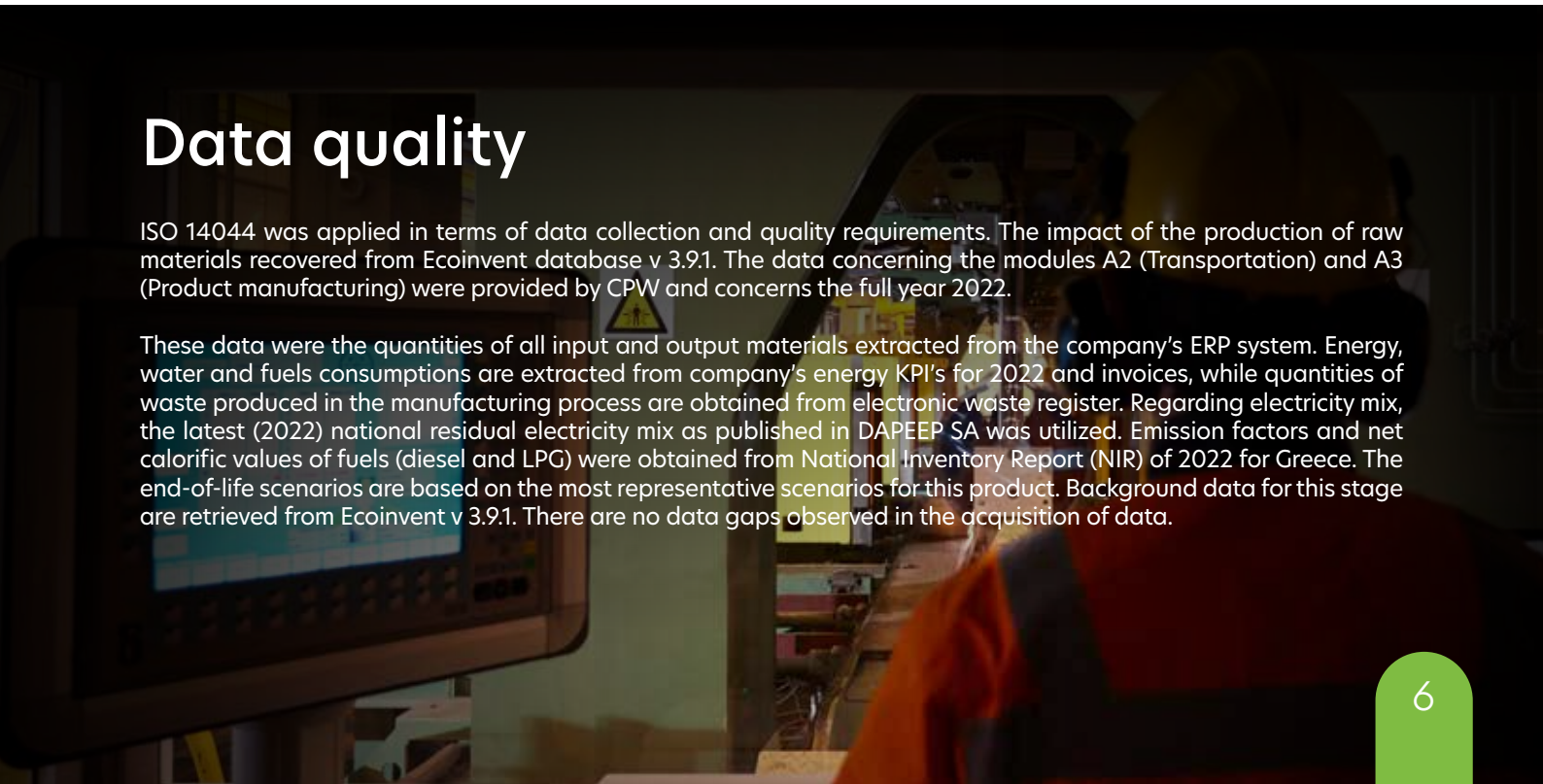
Allocation rules have been performed in accordance with the requirements of ISO 14044:2006. Where allocation cannot be avoided, the inputs and outputs of the system were partitioned between its different products or functions in a way that reflects the underlying physical or economic relationships between them. In this case, allocation based on the mass of steel used for each pipe (HFIW, LSAW, HSAW) has been applied in the amounts of some raw materials used in three types of pipes (concrete, blast furnace slag, sand and welding materials) and in consumption of diesel used for internal transportation, water, electricity and wastes generated through the manufacturing process, based on the mass of the final products.

Assumptions

Software used: **Software OpenLCA v.2.0.0 was used**
Scope: **Worldwide**
Time representativeness: **Data for year 2022 is used**

(2022 is the reference year, due to the need of updating the EPD, as there were significant changes in the results during the annual follow up procedure. It should be noted that no concrete coated LSAW pipes were produced in 2022, so in this product the reference year is 2020 there are no changes in the results in this version of EPD, compared to the previous one.)

Module A2:	a EURO5 lorry 16-32 metric ton was utilized for road transportation and a bulk carrier for dry goods for sea transportation
Module C1:	the specific diesel consumption for a building demolition is considered as 0,239 MJ/kg product of material according to JRC TECHNICAL REPORT ''Model for Life Cycle Assessment (LCA) of buildings''.
Module C2:	a conservative assumption of 100 km by lorry 16-32 metric ton was used.
Module C3 &C4:	For end-of-life stage, the most representative scenarios based on the characteristics of the final products and current bibliography are used. - According to ''Seventh global LCI study for steel products'' published in Worldsteel Association, an average of 85% of all steel is recycled at the end of a product's life. - 85% of final steel product is recycled and 15% of the final product is transported for final disposal (landfill).
Cut-off Rules:	The cut-off criteria adopted is as stated in "EN 15804:2012+A2:2019". Where there is insufficient data for a unit process, the cut-off criteria are 1% of the total mass of input of that process. The total of neglected input flows per module is a maximum of 5% of energy usage and mass. The cut-off rules were applied for some wastes generated from steel treatment, since they contribute less than 1% by mass.



Data quality

ISO 14044 was applied in terms of data collection and quality requirements. The impact of the production of raw materials recovered from Ecoinvent database v 3.9.1. The data concerning the modules A2 (Transportation) and A3 (Product manufacturing) were provided by CPW and concerns the full year 2022.

These data were the quantities of all input and output materials extracted from the company's ERP system. Energy, water and fuels consumptions are extracted from company's energy KPI's for 2022 and invoices, while quantities of waste produced in the manufacturing process are obtained from electronic waste register. Regarding electricity mix, the latest (2022) national residual electricity mix as published in DAPEEP SA was utilized. Emission factors and net calorific values of fuels (diesel and LPG) were obtained from National Inventory Report (NIR) of 2022 for Greece. The end-of-life scenarios are based on the most representative scenarios for this product. Background data for this stage are retrieved from Ecoinvent v 3.9.1. There are no data gaps observed in the acquisition of data.

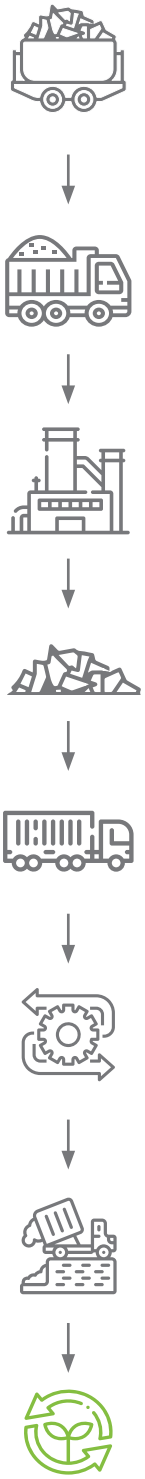
System Boundaries

The scope of the study is set to be Cradle-to-gate with modules C+D. The systems boundaries are strictly referred to the manufacturing plant of Thisvi and described in more detail below:

	X= Included, MND= Module Not Declared																
	Product stage			Construction stage		Use stage							End of life stage				Resource recovery stage
	Raw Materials Supply	**Transport**	**Manufacturing**	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	**De-construction and demolition**	**Transport**	**Waste processing for reuse, recovery and/or recycling**	**Disposal**	**Reuse-Recovery-Recycling-potential**
Module	**A1**	**A2**	**A3**	A4	A5	B1	B2	B3	B4	B5	B6	B7	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X
Geography	GLO	GLO	GR										EU	EU	EU	EU	EU
Specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - products	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites	Not relevant				-	-	-	-	-	-	-	-	-	-	-	-	-

Modules of analysis: X=Module declared, MND=Module Not Declared

System Boundaries



A1: Raw Material Supply

The production starts with the material supply. This stage includes the mining and processing of raw materials, the generation of electricity and fuels required for the manufacturing stage. Steel is the main raw material for the manufacturing of pipes, while for coating of pipes epoxy resins, coating powder, polyethylene/polypropylene welding materials and concrete are used.

A2: Transportation of raw materials to manufacturer

Transportation is relevant to delivery of raw materials from the supplier to the gate of manufacturing plant. Raw materials for the production are transported by trucks and vessels from different regions all over the world.

A3: Manufacturing

Manufacturing starts with the production of bare steel pipes. This is accomplished through welding of steel coils and plates that are the main raw materials. After this stage, pipes undergo a coating process. Raw materials used in this stage are epoxy resin and powder, polyethylene, polypropylene and concrete for LSAW pipes. Final products are not packaged.

C1: De-construction and demolition

This module includes the deconstruction/demolition of pipes. The necessary energy consumption was considered equal to 0,239 MJ/kg or 239 MJ/ton of product deconstructed, in accordance with the ''JRC Technical Report "Model for Life Cycle Assessment (LCA) of buildings".

C2: Transport to waste processing

Transportation of the discarded product either to the recycling site or to landfills for final disposal. A distance of 100 km by lorry 16-32 tonnes from construction/demolition sites to disposal sites has been chosen as a conservative assumption.

C3: Waste processing for reuse, recovery and/or recycling

This module includes waste processing of the product after its life cycle in order to be recycled and reused in another product system. End-of waste state of the product is reached when steel scrap is collected from the scrap yard by other manufacturers in order to be reused for another product system (steel industries). According to ''Seventh global LCI study for steel products'' published in Worldsteel Association, an average of 85% of all steel is recycled at the end of a product's life. It is assumed that there is no sorting or processing required for steel pipes, thus the environmental impact for this module is set to be zero.

C4: Disposal

This module includes the final disposal of the discarded product. As it is said above, 85% of final steel product is recycled and 15% of the final product is transported for final disposal (landfill). For LSAW pipes, concrete, powder and plastic included in the final product will be landfilled after pipes life cycle.

D: Reuse-Recovery-Recycling-potential

Module D consists of avoided burdens related to the potential reuse and/or recycling of the product after its end-of-life stage.

Environmental Perfomance

Bare LSAW Steel Pipes

Environmental impacts

	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	2,45E+03	9,78E+01	4,50E+01	2,59E+03	2,43E+01	1,93E+01	0,00E+00	9,52E-01	-1,38E+03
GWP-fossil	kg CO2 eq	2,45E+03	9,77E+01	4,18E+01	2,59E+03	2,43E+01	1,93E+01	0,00E+00	9,51E-01	-1,38E+03
GWP-biogenic	kg CO2 eq	2,14E+00	2,87E-02	1,25E-01	2,30E+00	3,76E-03	6,83E-03	0,00E+00	4,54E-04	-1,36E+00
GWP-luluc	kg CO2 eq	1,27E+00	7,53E-02	5,03E-02	1,40E+00	2,68E-03	9,21E-03	0,00E+00	5,59E-04	-1,09E+00
GWP-GHG	kg CO2 eq	2,34E+03	6,72E+01	4,41E+01	2,45E+03	2,36E+01	3,69E+00	0,00E+00	9,04E-01	-1,37E+03
ODP	kg CFC-11 eq	4,46E-05	1,68E-06	8,16E-07	4,71E-05	3,77E-07	4,10E-07	0,00E+00	2,64E-08	3,50E-05
AP	mol H+ eq	9,98E+00	1,72E+00	2,43E-01	1,19E+01	2,20E-01	6,14E-02	0,00E+00	6,87E-03	-5,79E+00
EP-freshwater	kg PO4-3 eq	3,43E+00	1,49E-02	1,74E-01	3,62E+00	2,23E-03	4,04E-03	0,00E+00	2,33E-04	-2,75E+00
EP-freshwater	kg P eq	1,12E+00	4,84E-03	5,68E-02	1,18E+00	7,28E-04	1,32E-03	0,00E+00	7,59E-05	-8,96E-01
EP-marine	kg N eq	2,21E+00	4,08E-01	5,02E-02	2,67E+00	1,02E-01	2,11E-02	0,00E+00	2,64E-03	-1,33E+00
EP-terrestrial	mol N eq	2,34E+01	4,51E+00	4,23E-01	2,84E+01	1,11E+00	2,23E-01	0,00E+00	2,83E-02	-1,53E+01
POCP	kg NMVOC eq	1,13E+01	1,30E+00	1,42E-01	1,28E+01	3,28E-01	9,17E-02	0,00E+00	9,84E-03	-3,38E+00
ADPe	kg Sb eq	1,90E-02	1,83E-04	5,47E-05	1,93E-02	8,28E-06	6,04E-05	0,00E+00	1,27E-06	-1,50E-02
ADPf	MJ	2,51E+04	1,24E+03	6,87E+02	2,71E+04	3,11E+02	2,67E+02	0,00E+00	2,27E+01	2,26E+04
WDP	m3 eq	9,01E+02	4,91E+00	1,64E+01	9,22E+02	8,06E-01	1,42E+00	0,00E+00	1,02E+00	-6,12E+02

Environmental impacts for 1 ton of bare LSAW pipes

(1) GWP-GHG indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide emissions and uptake and biogenic carbon stored in the product, with characterization factors (CFs) based on IPCC (2013).
(2) Eutrophication aquatic freshwater shall be given in both kg PO4 eq and kg P eq.
(3) The results of WDP, ADPe and ADPf shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

Bare LSAW Steel Pipes

Resource Use

	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PERE	MJ	2,52E+03	1,40E+01	1,00E+02	2,63E+03	1,77E+00	4,14E+00	0,00E+00	1,92E-01	-1,85E+03
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,52E+03	1,40E+01	1,00E+02	2,63E+03	1,77E+00	4,14E+00	0,00E+00	1,92E-01	-1,85E+03
PENRE	MJ	2,51E+04	1,24E+03	6,87E+02	2,71E+04	3,11E+02	2,67E+02	0,00E+00	2,27E+01	2,26E+04
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,51E+04	1,24E+03	6,87E+02	2,71E+04	3,11E+02	2,67E+02	0,00E+00	2,27E+01	2,26E+04
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	2,10E+01	1,14E-01	3,82E-01	2,15E+01	1,88E-02	3,32E-02	0,00E+00	2,37E-02	4,04E+01

Resource use for 1 ton of bare LSAW pipes

Output flows and waste categories

	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
HWD	kg	1,97E-01	6,84E-03	1,43E-03	2,05E-01	2,09E-03	1,70E-03	0,00E+00	1,20E-04	1,29E-01
NHWD	kg	1,01E+03	2,64E+01	1,68E+00	1,04E+03	4,45E-01	1,30E+01	0,00E+00	1,50E+02	-8,33E+02
RWD	kg	2,49E-02	2,59E-04	2,41E-03	2,75E-02	3,40E-05	8,67E-05	0,00E+00	3,36E-06	-8,86E-03
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Output flows and waste categories for 1 ton of bare LSAW pipes

Environmental Perfomance

PE/PP+Powder Coated LSAW Steel Pipes

Environmental impacts

	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	2,45E+03	9,97E+01	7,17E+01	2,62E+03	2,43E+01	1,93E+01	0,00E+00	3,91E+00	-1,36E+03
GWP-fossil	kg CO2 eq	2,45E+03	9,96E+01	6,40E+01	2,61E+03	2,43E+01	1,93E+01	0,00E+00	3,91E+00	-1,35E+03
GWP-biogenic	kg CO2 eq	2,20E+00	2,95E-02	1,99E-01	2,43E+00	3,76E-03	6,83E-03	0,00E+00	6,40E-04	-1,33E+00
GWP-luluc	kg CO2 eq	1,27E+00	7,59E-02	7,98E-02	1,42E+00	2,68E-03	9,21E-03	0,00E+00	7,27E-04	-1,07E+00
GWP-GHG	kg CO2 eq	2,33E+03	6,70E+01	7,04E+01	2,47E+03	2,36E+01	3,69E+00	0,00E+00	3,45E+00	-1,34E+03
ODP	kg CFC-11 eq	4,52E-05	1,72E-06	1,26E-06	4,81E-05	3,77E-07	4,10E-07	0,00E+00	3,14E-08	3,44E-05
AP	mol H+ eq	1,00E+01	1,71E+00	3,63E-01	1,21E+01	2,20E-01	6,14E-02	0,00E+00	1,02E-02	-5,69E+00
EP-freshwater	kg PO4-3 eq	3,38E+00	1,53E-02	2,77E-01	3,68E+00	2,23E-03	4,04E-03	0,00E+00	3,26E-04	-2,70E+00
EP-freshwater	kg P eq	1,10E+00	5,00E-03	9,04E-02	1,20E+00	7,28E-04	1,32E-03	0,00E+00	1,06E-04	-8,81E-01
EP-marine	kg N eq	2,20E+00	4,07E-01	6,89E-02	2,67E+00	1,02E-01	2,11E-02	0,00E+00	3,94E-02	-1,31E+00
EP-terrestrial	mol N eq	2,33E+01	4,49E+00	5,55E-01	2,84E+01	1,11E+00	2,23E-01	0,00E+00	4,35E-02	-1,50E+01
POCP	kg NMVOC eq	1,13E+01	1,30E+00	1,92E-01	1,28E+01	3,28E-01	9,17E-02	0,00E+00	1,55E-02	-3,32E+00
ADPe	kg Sb eq	1,89E-02	1,91E-04	8,62E-05	1,92E-02	8,28E-06	6,04E-05	0,00E+00	1,78E-06	-1,47E-02
ADPf	MJ	2,61E+04	1,26E+03	1,06E+03	2,85E+04	3,11E+02	2,67E+02	0,00E+00	2,70E+01	2,22E+04
WDP	m3 eq	9,17E+02	5,08E+00	2,60E+01	9,48E+02	8,06E-01	1,42E+00	0,00E+00	1,20E+00	-6,01E+02

Environmental impacts for 1 ton of PE/PP+powder coated LSAW pipes

(1) GWP-GHG indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide emissions and uptake and biogenic carbon stored in the product, with characterization factors (CFs) based on IPCC (2013).
(2) Eutrophication aquatic freshwater shall be given in both kg PO4 eq and kg P eq.
(3) The results of WDP, ADPe and ADPf shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

PE/PP+Powder Coated LSAW Steel Pipes

Resource Use

	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PERE	MJ	2,50E+03	1,45E+01	1,59E+02	2,68E+03	1,77E+00	4,14E+00	0,00E+00	2,85E-01	-1,82E+03
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,50E+03	1,45E+01	1,59E+02	2,68E+03	1,77E+00	4,14E+00	0,00E+00	2,85E-01	-1,82E+03
PENRE	MJ	2,61E+04	1,26E+03	1,06E+03	2,85E+04	3,11E+02	2,67E+02	0,00E+00	2,70E+01	2,22E+04
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,61E+04	1,26E+03	1,06E+03	2,85E+04	3,11E+02	2,67E+02	0,00E+00	2,70E+01	2,22E+04
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	2,15E+01	1,18E-01	6,06E-01	2,22E+01	1,88E-02	3,32E-02	0,00E+00	2,80E-02	3,97E+01

Resource use for 1 ton of PE/PP+powder coated LSAW pipes

Output flows and waste categories

	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
HWD	kg	1,94E-01	7,03E-03	2,06E-03	2,03E-01	2,09E-03	1,70E-03	0,00E+00	1,42E-04	1,27E-01
NHWD	kg	9,99E+02	2,82E+01	2,63E+00	1,03E+03	4,45E-01	1,30E+01	0,00E+00	1,64E+02	-8,19E+02
RWD	kg	2,54E-02	2,69E-04	3,83E-03	2,95E-02	3,40E-05	8,67E-05	0,00E+00	5,07E-06	-8,70E-03
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Output flows and waste categories for 1 ton of PE/PP+powder coated LSAW pipes

Environmental Perfomance

PE/PP+Powder+Concrete Coated LSAW Steel Pipes

Environmental impacts

	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO2 eq	1,92E+03	1,08E+02	4,61E+01	2,08E+03	2,19E+01	1,65E+01	0,00E+00	4,67E+00	-1,86E+03
GWP-fossil	kg CO2 eq	1,92E+03	1,08E+02	4,07E+01	2,07E+03	2,19E+01	1,65E+01	0,00E+00	4,67E+00	-1,86E+03
GWP-biogenic	kg CO2 eq	1,77E+00	3,21E-02	1,42E-01	1,95E+00	3,59E-03	5,55E-03	0,00E+00	8,07E-04	-1,68E+00
GWP-luluc	kg CO2 eq	1,06E+00	5,14E-02	5,87E-02	1,17E+00	1,74E-03	5,58E-03	0,00E+00	1,20E-03	-9,68E-01
GWP-GHG	kg CO2 eq	1,84E+03	1,07E+02	4,55E+01	1,99E+03	7,18E-01	1,63E+01	0,00E+00	4,15E+00	-1,78E+03
ODP	kg CFC-11 eq	9,01E-05	2,36E-05	3,19E-06	1,17E-04	4,72E-06	3,77E-06	0,00E+00	4,78E-07	-7,85E-05
AP	mol H+ eq	7,99E+00	1,68E+00	2,49E-01	9,93E+00	2,28E-01	8,25E-02	0,00E+00	1,39E-02	-7,47E+00
EP-freshwater	kg PO4-3 eq	2,62E+00	1,79E-02	1,69E-01	2,81E+00	2,02E-03	3,42E-03	0,00E+00	4,00E-04	-2,70E+00
EP-freshwater	kg P eq	8,55E-01	5,85E-03	5,50E-02	9,16E-01	6,60E-04	1,11E-03	0,00E+00	1,30E-04	-8,81E-01
EP-marine	kg N eq	1,71E+00	4,49E-01	5,02E-02	2,21E+00	1,01E-01	2,88E-02	0,00E+00	4,92E-02	-1,51E+00
EP-terrestrial	mol N eq	1,82E+01	4,97E+00	4,31E-01	2,36E+01	1,11E+00	3,14E-01	0,00E+00	5,55E-02	-1,60E+01
POCP	kg NMVOC eq	8,32E+00	1,32E+00	1,23E-01	9,76E+00	3,04E-01	8,95E-02	0,00E+00	1,73E-02	-7,83E+00
ADPe	kg Sb eq	2,53E-02	2,97E-04	7,24E-05	2,57E-02	8,83E-06	5,98E-05	0,00E+00	3,16E-06	-2,61E-02
ADPf	MJ	2,11E+04	1,55E+03	7,26E+02	2,33E+04	3,00E+02	2,51E+02	0,00E+00	3,37E+01	-1,92E+04
WDP	m3 eq	7,73E+02	6,00E+00	2,07E+01	8,00E+02	2,16E+01	1,17E+00	0,00E+00	1,54E+00	-7,26E+02

Environmental impacts for 1 ton of PE/PP+powder+concrete coated LSAW pipes

PE/PP+Powder+Concrete Coated LSAW Steel Pipes

Resource Use

	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PERE	MJ	1,85E+03	1,71E+01	1,05E+02	1,97E+03	1,56E+00	3,38E+00	0,00E+00	3,54E-01	-1,88E+03
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,00E+02	0,00E+00	5,17E+02	0,00E+00
PERT	MJ	1,85E+03	1,71E+01	1,05E+02	1,97E+03	1,56E+00	1,03E+02	0,00E+00	5,17E+02	-1,88E+03
PENRE	MJ	2,11E+04	1,55E+03	7,26E+02	2,33E+04	3,00E+02	2,51E+02	0,00E+00	3,37E+01	-1,92E+04
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,00E+02	0,00E+00	5,17E+02	0,00E+00
PENRT	MJ	2,11E+04	1,55E+03	7,26E+02	2,33E+04	3,00E+02	3,51E+02	0,00E+00	5,50E+02	-1,92E+04
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	1,80E+01	1,40E-01	4,82E-01	1,86E+01	1,67E-02	2,71E-02	0,00E+00	3,59E-02	-1,69E+01

Resource use for 1 ton of PE/PP+powder+concrete coated LSAW pipes

Output flows and waste categories

	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
HWD	kg	1,31E-01	3,11E-03	4,12E-04	1,34E-01	8,10E-04	6,54E-04	0,00E+00	5,15E-05	-1,36E-01
NHWD	kg	7,29E+02	5,00E+01	2,20E+00	7,81E+02	3,69E-01	1,20E+01	0,00E+00	2,10E+02	-7,61E+02
RWD	kg	3,90E-02	1,07E-02	4,06E-03	5,38E-02	2,09E-03	1,72E-03	0,00E+00	2,17E-04	-3,29E-02
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Output flows and waste categories for 1 ton of PE/PP+powder+concrete coated LSAW pipes

Additional Information

The EPD does not give information on release of dangerous substances to soil, water and indoor air because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonized test methods according to the provisions of the respective technical committees for European product standards are not available.

List of abbreviations

LCA	Life Cycle assessment
EPD	Environmental Product Declaration
PCR	Product category rules
GLO	Global
RER	Europe
RoW	Rest of the world
GWP-total	Global Warming Potential total
GWP-fossil	Global Warming Potential fossil
GWP-biogenic	Global Warming Potential biogenic
GWP-luluc	Global Warming Potential land use and land use change
ODP	Ozone Depletion Potential
AP	Acidification Potential
EP-freshwater	Eutrophication potential, fraction of nutrients reaching freshwater end compartment
EP-marine	Eutrophication Potential fraction of nutrients reaching marine end compartment
EP- terrestrial	Eutrophication potential, Accumulated Exceedance
POCP	Formation potential of tropospheric ozone photochemical oxidants
ADPe	Abiotic depletion potential for non-fossil resources
ADPf	Abiotic depletion potential for fossil resources

WDP	Water use
PERE	Use of renewable primary energy excluding resources used as raw materials
PERM	Use of renewable primary energy resources used as raw materials
PERT	Total use of renewable primary energy resources
PENRE	Use of non-renewable primary energy excluding resources used as raw materials
PENRM	Use of non-renewable primary energy resources used as raw materials
PENRT	Total use of non-renewable primary energy resources
SM	Use of secondary material
RSF	Use of renewable secondary fuels
NRSF	Use of non-renewable secondary fuels
FW	Use of net fresh water
HWD	Hazardous waste disposed
NHWD	Non-hazardous waste disposed
RWD	Radioactive waste disposed
CRU	Components for re-use
MFR	Materials for recycling
MER	Materials for energy recovery
EE	Exported Energy

Differences from previous versions

Date of revision (1) 2023-05-12 : An update of the results was made using supplier-specific data for the production of steel
Date of revision (2) 2023-09-15: EPD update due to significant changes to the results using the data of 2022 during the annual follow up procedure and using the new version (3.9.1) of Ecoinvent

References

- **General Programme Instructions**
  of the International EPD® System. Version 3.01, 2019-09-18
- **PCR 2019:14**
  v.1.11 Construction products. EPD® System. Date 2021-02-05. Valid until 2024-12-20
- **EN 15804:2012+A2:2019**
  Sustainability of construction works - Environmental Product Declarations — Core rules for the product category of construction products
- **ISO 14020:2000**
  Environmental labels and declarations — General principles
- **ISO 14025:2006**
  Environmental labels and declarations - Type III environmental declarations — Principles and procedures
- **ISO 14040:2006**
  Environmental management - Life cycle assessment-Principles and framework
- **ISO 14044:2006**
  Environmental management - Life cycle assessment - Requirements and guidelines
- **Ecoinvent / Ecoinvent Centre,** www.Eco-invent.org
- **Residual Energy Mix 2022**
  from Renewable Energy Sources Operator & Guarantees of Origin (DAPEEP SA)
- **TACKLING RECYCLING ASPECTS IN EN15804**
  Christian Leroy, Jean-Sebastien Thomas, Nick Avery, Jan Bollen, Ladji Tikana
- **Seventh global LCI study for steel product**
  Worldsteel Association
- **Model for Life Cycle Assessment (LCA) of buildings**
  European Commission, Joint Research Centre

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