

Environmental Product Declaration



In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Hot-rolled coils of carbon, carbon structural, and low-alloy steels

from

PJSC “ZAPORIZHSTAL”

EPD of multiple products, based on average results



METINVEST

Programme:

The International EPD® System, www.environdec.com

Programme operator:

EPD International AB

EPD registration number:

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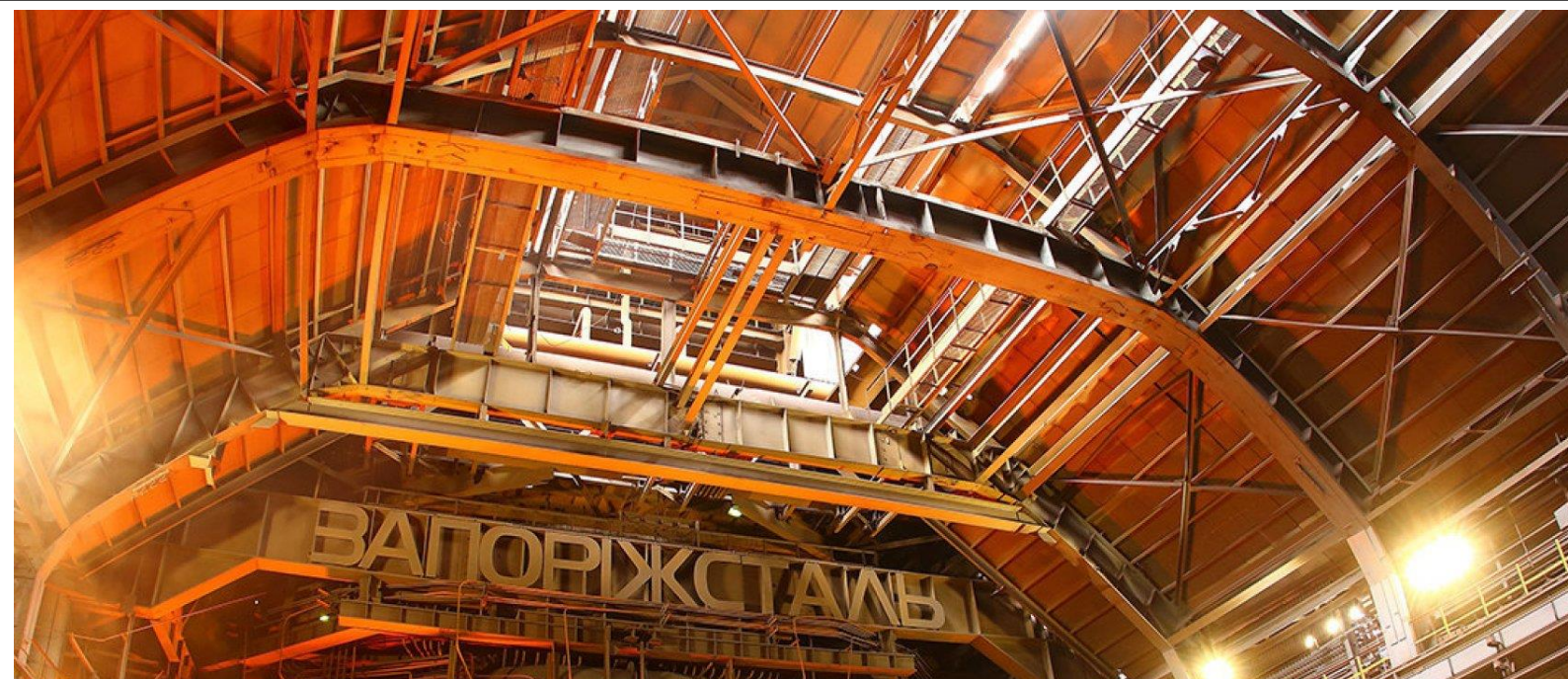
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Valid until:

2030-06-11

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 www.environdec.com



General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification

Product Category Rules (PCR)

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product Category Rules (PCR): PCR 2019:14 CONSTRUCTION PRODUCTS, version 1.3.4.

PCR review was conducted by: The Technical Committee of the International EPD® System. Chair of the PCR review is Claudia A. Peña. The review panel may be contacted via info@environdec.com

Life Cycle Assessment (LCA)

LCA accountability: LCA Studio s.r.o.

Mgr. Ivanna Harasymchuk, Ing. et Ing. Tatiana Trecáková, PhD., prof. Ing. Vladimír Kočí, Ph.D., MBA
Šárecká 1962/5, 16000 Prague 6, Czech Republic, www.lcastudio.cz



Third-party verification

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

☒ EPD verification by individual verifier

Third-party verifier: prof. **Ing. Silvia Vilčeková, Ph.D., Silcert, s.r.o.**

Approved by: The International EPD® System

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

☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: PJSC “ZAPORIZHSTAL”

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Description of the organisation:

PJSC “ZAPORIZHSTAL” is one of the largest steel producers in Ukraine, specializing in the production of high-quality hot-rolled and cold-rolled steel products, carbon and low-alloy steel sheets, steel strip, black tinplate, commercial pig iron, and slabs. The company is renowned for its commitment to high production standards, product quality, and environmental sustainability.

PJSC “ZAPORIZHSTAL STRUCTURE

To maintain a strong competitive advantage and expand its global presence, Zaporizhstal is part of Metinvest Group, a vertically integrated international steel and mining group. This allows the company to integrate production and distribution capabilities, ensuring high-quality products and professional services for clients worldwide.

The company exports its steel products to more than 50 countries, serving key industries such as construction, mechanical engineering, shipbuilding, automotive, energy, and more. Its primary customers include manufacturers of pipes, metal structures, and machinery, as well as large industrial enterprises.

PRODUCT RANGE & INDUSTRY APPLICATIONS

Zaporizhstal retains a significant market share in Europe and beyond, supplying a wide range of steel products, including:

- Hot-rolled and cold-rolled steel – used in construction, machine building, automotive, and heavy industry
- Steel strips and sheets – for mechanical engineering and industrial applications
- Black tinplate – widely applied in the packaging industry
- Commercial pig iron and slabs – essential for further steel processing and casting

The company continuously modernizes its production facilities to meet the growing demand for high-value-added products that comply with international quality standards.

PJSC “ZAPORIZHSTAL” prioritizes:

- The health and safety of its employees, partners, and visitors
- Environmental protection, focusing on pollution prevention and reducing its carbon footprint
- Sustainable production practices, implementing eco-friendly technologies to minimize industrial emissions and waste

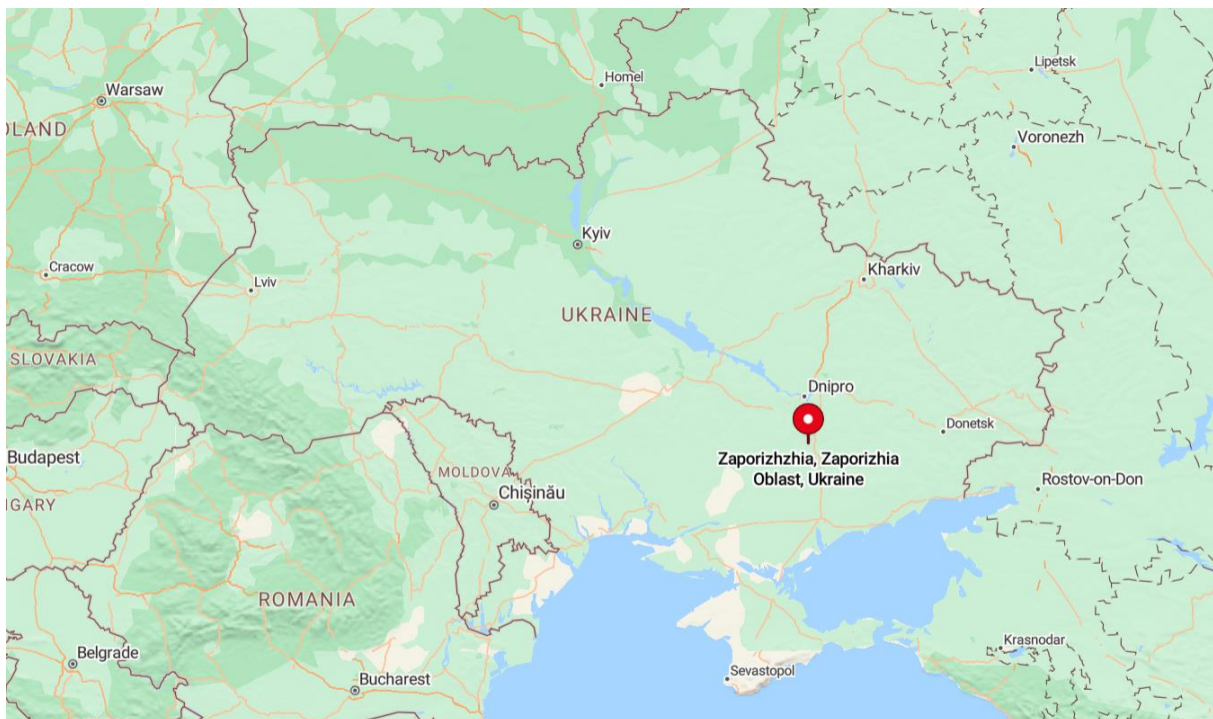
The company is actively investing in modern environmental initiatives, including upgrading its manufacturing processes to comply with European environmental regulations.

Product-related or management system-related certifications:

PJSC “ZAPORIZHSTAL” has an integrated Management System according to standards ISO 9001 and ISO 14001 and ISO 45001, enabling the company to streamline operation, improve efficiency and meet stakeholders expectation. PJSC “ZAPORIZHSTAL” is focuses on consistently delivering high-quality products, emphasizes customer satisfaction, compliance with regularly requirements and continuous improvement. Company promotes sustainability by minimizing the environmental impact of operation, include waste management, pollution prevention and resource conservation from a circular perspective. PJSC “ZAPORIZHSTAL” ensure a safe and healthy workplace for employees, implement measures to identify, evaluate and mitigate occupational hazards. PJSC “ZAPORIZHSTAL” is committed to reduce the intensity and overall level of CO₂ emissions by using energy resources efficiency, implementing best available technologies.

Name and location of production site(s):

Zaporizhstal Steel Works is strategically located in Zaporizhzhia, Ukraine, an important industrial center known for its strong metallurgical and heavy industry base. The production site is situated at:
72 Pivdenne Highway, Zaporizhzhia, 69008, Ukraine



Product information

Product name: Hot-rolled coils of carbon, carbon structural, and low-alloy steels

Product identification:

HRC are manufactured with a thickness ranging from 1.5 mm to 10.0 mm and a width of 860 mm to 1500 mm, depending on the steel grade.

EN 10025-2:2019: "Hot rolled products of structural steels – Part 2: Technical delivery conditions for non-alloy structural steels".

Steel grades of hot-rolled coils

Standard	Steel type	Grade
DSTU 7809:2015, GOST 9045-93, EN 10130:2006, EN 10111:2008, EN 10346:2009, TU U 14-4-458-99, DSTU 2651:2005/ GOST 380-2005	Non-alloy structural and low-carbon steels	08ps (kp), 10ps (kp), 15ps (kp), 20ps (kp), 25ps, St0, St1ps (kp), St2ps (kp), St3ps (kp), St4ps (kp),
	Cold-rolled and deep-drawing steels	DC01, DX51D, DD11
	Special-purpose steels	08Yu
DSTU 7809:2015, DSTU 2651:2005/ GOST 380-2005, EN 10025-2:2019, TU U 14-2-1241-2000	Carbon and structural steels	10, 15, 20, 25, 30
	Non-alloy structural steels	St0, St2sp, St3sp, St4sp
	Low-alloy high-strength steels	S235JR, S275JR,
	Copper-bearing steel for improved corrosion resistance	St15 midista (copper-bearing steel)
DSTU 8541:2015, DSTU 7806:2015, TU U 27.3-00190319-1313-2004, DSTU 2651:2005/ GOST 380-2005	High-strength low-alloy steels	09G2, 09G2D, 09G2S,
DSTU 7809:2015, DSTU 8429:2015	High-carbon structural steels	45, 55
	Spring steels	65G, 60G, 70G
EN 10025-2:2019, TU U 27.1-23365425-621:2007	General-purpose structural steels	S235JR, S275JR
	High-strength structural steels	S355JR, S355J2, S355J0
DSTU 7806:2015	High-strength alloy steel	30XH2MA
DSTU EN 10083-3:2006	Wear-resistant and boron-alloyed steel	30MnB5

Product description:

A hot-rolled steel coil is a type of flat steel rolled product manufactured in hot rolling mills. The hot-rolled coil is produced from a slab that is heated in a furnace to a temperature of 1200°C, then rolled in a hot rolling mill, descaled using high-pressure water, and rolled again. In the next step, the steel is cooled and cut. The metal is cooled using water or air and then coiled by a winder. The next stage is heat treatment (performed optionally if required by the standard or the customer): the sheet is reheated in furnaces and cooled under specific conditions. During rolling in the mills, technological parameters are set to ensure that the metal acquires properties identical to those obtained through separate reheating in furnaces.

Hot-rolled coils made of carbon, structural carbon, and low-alloy steels are widely used in various industries, such as construction, the production of structural steel profiles and



pipes, and mechanical engineering



for the manufacturing of steel components, various metal products, and as feedstock for cold-rolled steel production. The high demand and diverse applications dictate certain variations in the chemical composition and physical-mechanical properties of hot-rolled steel coils. At Zaporizhstal, hot-rolled coils differ in steel grade, chemical composition, mechanical properties, geometric dimensions, and the final product's weight.

UN CPC code: 41211- Flat-rolled products of non-alloy steel, not further worked than hot-rolled, of a width of 600 mm or more.

Geographical scope: Global, Ukraine

LCA information

Functional unit / declared unit:

The declared unit refers to 1 ton of hot-rolled coils of carbon, carbon structural, and low-alloy steels.

Time representativeness:

Site specific data from producer are based on 1 year average for process data (reference year 2023). Time scope less than 10-years was applied for background data. Time scope less than 2-years was applied for specific data.

Database(s) and LCA software used:

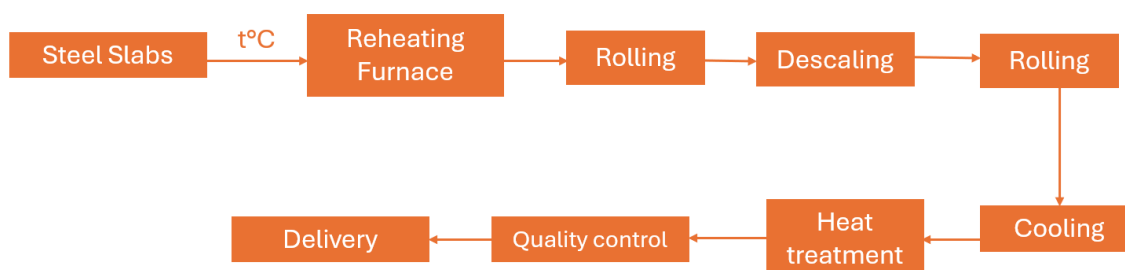
LCA for Experts (Sphera), Sphera database and ecoinvent database.

Description of system boundaries:

This EPD is based on system boundary cradle to gate, modules C1–C4, module D and with optional modules A4-A5.

The system boundary covers the production of raw materials, all relevant transport down to factory gate, manufacturing by PJSC “ZAPORIZHSTAL”, transport from the by PJSC “ZAPORIZHSTAL” to the site and installation of construction product based at hot-rolled steel coils including product unpacking, deconstruction, transport of used construction product based at hot-rolled steel coils, sorting of used construction product based at hot-rolled steel coils, treatment of produced waste (recycling and landfill of fractions not entering the recycling treatment).

System diagram:



Cut off rules: The cut-off criterion was chosen based on the used PCR. According to the used PCR, more than 99 % of flows were included.

Allocations: Specific inputs and outputs were measured or calculated for specific product.

The allocation of CO₂ emissions was based on a fuel consumption approach. For the allocation of post-industry scrap, an economic approach was applied.

Electricity mix: Generation of electricity consumed within the production was based on the Ukrainian product electricity mix. GWP-GHG indicator of the used Ukrainian product electricity mix is 0,47 kg CO₂eq./kWh.

Characterisation factors: Characterisation factors are based on Environmental Footprint 3.1. (EF 3.1).

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	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	x	x	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x
Geography	GLO	GLO	UA	EU	EU	NR	NR	NR	NR	NR	NR	NR	EU	EU	EU	EU	EU
Specific data used	78,0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	<10%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Hot-rolled coils of carbon, carbon structural, and low-alloy steels	1000	7,08%	0%
Chemical composition			
Iron	992,1		
Manganese	4,6		
Silicon	0,3		
Carbon	1,2		
Other	1,8		
TOTAL	1000	7,08%	0%
Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Metal packaging	1,39	0,14%	0
Paper packaging	0,0001	0,00001%	0
TOTAL	1,3901	0,14001%	0

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit
No substances from the SVHC list to report.			

Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804

Results per 1 t of hot-rolled coils of carbon, carbon structural, and low-alloy steels									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	3,43E+03	3,12E+01	0,00E+00	6,29E+01	1,01E+01	2,07E+01	7,49E-01	-4,08E+02
GWP-biogenic	kg CO ₂ eq.	9,64E+00	9,10E-02	0,00E+00	2,10E-02	1,22E-01	9,01E-03	0,00E+00	6,60E-01
GWP-luluc	kg CO ₂ eq.	9,44E-01	1,13E-01	0,00E+00	6,23E-03	1,67E-01	2,46E-03	4,49E-03	-1,99E-01
GWP-total	kg CO ₂ eq.	3,44E+03	3,14E+01	0,00E+00	6,29E+01	1,04E+01	2,08E+01	7,53E-01	-4,08E+02
ODP	kg CFC 11 eq.	6,60E-06	2,70E-10	0,00E+00	1,35E-05	1,00E-12	1,66E-10	2,04E-12	1,29E-09
AP	mol H ⁺ eq.	6,22E+00	1,22E-01	0,00E+00	3,93E-01	1,29E-02	4,83E-02	5,31E-03	-9,36E-01
EP-freshwater	kg P eq.	9,39E-02	4,07E-05	0,00E+00	1,95E-03	4,24E-05	8,96E-06	1,71E-06	-3,90E-05
EP-marine	kg N eq.	1,47E+00	4,23E-02	0,00E+00	1,64E-01	4,58E-03	1,12E-02	1,37E-03	-2,27E-01
EP-terrestrial	mol N eq.	1,51E+01	4,63E-01	0,00E+00	1,79E+00	5,50E-02	1,21E-01	1,51E-02	-2,46E+00
POCP	kg NMVOC eq.	4,96E+00	2,08E-04	0,00E+00	5,03E-01	1,28E-02	3,31E-02	4,19E-03	-7,54E-01
ADP-minerals&metals*	kg Sb eq.	3,16E-04	1,72E-06	0,00E+00	3,24E-05	8,46E-07	8,49E-07	4,86E-08	-4,54E-06
ADP-fossil*	MJ	3,16E+04	5,41E+02	0,00E+00	8,60E+02	1,30E+02	3,53E+02	9,87E+00	-3,11E+03
WDP*	m ³	2,04E+03	1,50E+00	0,00E+00	2,12E+00	1,48E-01	8,75E-01	8,54E-02	-3,41E+00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; 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; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption								

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Additional mandatory and voluntary impact category indicators

Results per 1 t of hot-rolled coils of carbon, carbon structural, and low-alloy steels									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO ₂ eq.	3,43E+03	3,14E+01	0,00E+00	6,29E+01	1,03E+01	2,08E+01	7,55E-01	-4,08E+02
Particulate matter	Disease incidences	1,56E-04	1,23E-06	0,00E+00	6,77E-06	1,16E-07	4,03E-07	6,67E-08	-1,37E-05
Ionising radiation, human health	kBq U235 eq.	4,43E+01	8,80E+00	0,00E+00	3,89E+00	2,34E-02	5,39E+00	1,16E-02	5,49E+00
Ecotoxicity fresh water	CTUe	4,62E+03	1,08E+02	0,00E+00	2,30E+02	9,55E+01	8,28E+01	6,55E+00	-4,71E+02
Human toxicity, cancer	CTUh	2,45E-06	3,67E-09	0,00E+00	8,05E-08	1,91E-09	2,90E-09	1,34E-10	-6,38E-07
Human toxicity, non-cancer	CTUh	1,60E-05	1,44E-07	0,00E+00	1,98E-07	8,53E-08	8,51E-08	5,19E-09	5,57E-07
Land Use	Pt	1,42E+03	7,47E+01	0,00E+00	1,08E+02	4,75E+01	2,70E+01	2,81E+00	2,84E+02

Resource use indicators

Results per 1 t of hot-rolled coils of carbon, carbon structural, and low-alloy steels									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1,25E+03	7,21E+01	0,00E+00	4,87E+00	1,10E+01	4,01E+01	1,73E+00	5,42E+02
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
PERT	MJ	1,25E+03	7,21E+01	0,00E+00	4,87E+00	1,10E+01	4,01E+01	1,73E+00	5,42E+02
PENRE	MJ	3,16E+04	5,41E+02	0,00E+00	8,60E+02	1,30E+02	3,53E+02	9,87E+00	-3,11E+03
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
PENRT	MJ	3,16E+04	5,41E+02	0,00E+00	8,60E+02	1,30E+02	3,53E+02	9,87E+00	-3,11E+03
SM	kg	2,77E+02	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

¹ This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

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
FW	m ³	8,32E+01	9,95E-02	0,00E+00	4,93E-02	1,23E-02	5,66E-02	2,61E-03	-2,74E-01
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy 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 non-renewable primary energy 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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water								

Waste indicators

Results per 1 t of hot-rolled coils of carbon, carbon structural, and low-alloy steels									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	4,47E-03	6,72E-08	0,00E+00	0,00E+00	4,20E-09	4,18E-08	2,48E-09	1,38E-06
Non-hazardous waste disposed	kg	2,59E+01	1,26E-01	0,00E+00	0,00E+00	2,02E-02	8,46E-02	5,00E+01	-6,14E+00
Radioactive waste disposed	kg	5,46E-01	5,90E-02	0,00E+00	0,00E+00	1,68E-04	3,61E-02	1,02E-04	4,91E-02

Output flow indicators

Results per 1 t of hot-rolled coils of carbon, carbon structural, and low-alloy steels									
Indicator	Unit	A1-A3	A4	A5	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	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	1,51E+01	0,00E+00	0,00E+00	1,00E+03	0,00E+00	0,00E+00
Materials for energy recovery	kg	7,51E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	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

References

General Programme Instructions of the International EPD® System. Version 5.0.

Product Category Rules (PCR) document for Construction Products (PCR 2019:14 Version 1.3.4 2024-04-30)

ISO 14020:2000 Environmental labels and declarations — General principles, 2000-09

ISO 14025: EN ISO 14025:2006-11: Environmental labels and declarations - Type III environmental declarations — Principles and procedures

ISO 14040:2006 Environmental management — Life cycle assessment — Principles and framework, 2006-07

ISO 14044:2006 Environmental management — Life cycle assessment — Requirements and guidelines, 2006-07

EN 15804+A2:2019/AC:2021 European Committee for Standardization: Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products, 2021

Ecoinvent: www.ecoinvent.org, ecoinvent database.

Sphera: software LCA for Experts. 2023, Sphera solutions, www.sphera.com

