ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	voestalpine AG
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-VOE-20220069-IBA1-EN
Issue date	18.05.2022
Valid to	17.05.2027

Cold-rolled steel strip

voestalpine Stahl GmbH

Institut Bauen und Umwelt e.V.

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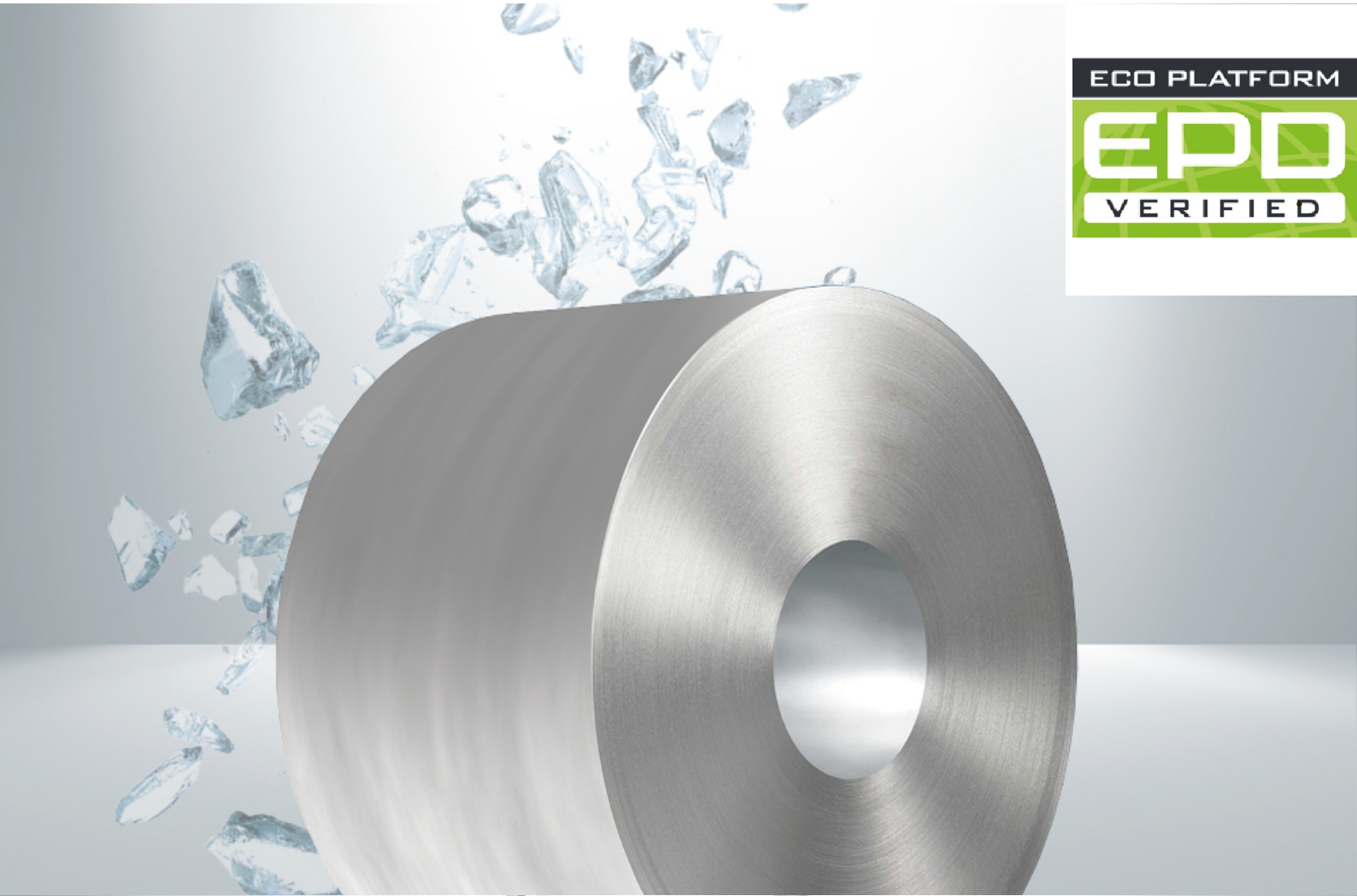


1. General Information

voestalpine Stahl GmbH	Cold-rolled steel strip
Programme holder IBU – Institut Bauen und Umwelt e.V. Hegelplatz 1 10117 Berlin Germany	**Owner of the declaration** voestalpine AG voestalpine-Strasse 3 4020 Linz Austria
Declaration number EPD-VOE-20220069-IBA1-EN	**Declared product / declared unit** 1 ton of cold-rolled steel strip
This declaration is based on the product category rules: Structural steels, 30.11.2017 (PCR checked and approved by the SVR)	**Scope:** This EPD is based on a declared unit of 1 ton of cold-rolled steel strip produced at the production site in Linz.
Issue date 18.05.2022	The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences. The EPD was created according to the specifications of *EN 15804+A2*. In the following, the standard will be simplified as *EN 15804*.
Valid to 17.05.2027	**Verification** The standard *EN 15804* serves as the core PCR Independent verification of the declaration and data according to *ISO 14025:2011* ☐ internally ☒ externally
Dipl. Ing. Hans Peters (chairman of Institut Bauen und Umwelt e.V.)	
Dr. Alexander Röder (Managing Director Institut Bauen und Umwelt e.V.))	Dr.-Ing. Andreas Ciroth (Independent verifier)

2. Product

2.1 Product description/Product definition

Cold-rolled steel strip produced by voestalpine Stahl GmbH consists of a steel strip that is produced continuously using the blast furnace production route. Low-alloy and medium-alloy steels were included in the averages set forth in this Environmental Product Declaration.
For the use and application of the product the respective national provisions at the place of use apply, in Austria, for example, the building regulations of individual provinces and the technical stipulations based on these regulations.

2.2 Application

The areas of application for cold-rolled steel strip are found in several industrial sectors that are divided into the following segments:

- House industry
- Section industry
- Tube and section industry
- Commercial vehicle industry
- Automotive supply industry
- Automotive
- Machinery industry
- Steel structures and plant building
- Pressure vessel production

Cold-rolled strip produced by voestalpine Stahl GmbH is supplied in various grades. Additional surface treatment steps such as pickling and annealing are performed to meet customer-specific product requirements. The strength and processing properties (forming, welding) of the declared product are defined by the selected chemical composition as well as the hot-rolling and annealing parameters.

2.3 Technical Data

For technical data, please refer to the declaration of performance:

Structural Data

Name	Value	Unit
Steel strip thickness	0.25 - 3.0	mm
Surface weight	2.0 - 23.6	kg/m²

Performance values of the product according to the declaration of performance in relation to essential characteristics in accordance with the following norms:

EN 10130:2007, Cold rolled flat products of mild steels for cold forming, Technical Delivery Conditions.

EN 10209:2013, Cold-rolled flat products made of mild steels for enameling, Technical Delivery Conditions.

EN 10268:2013, Cold-rolled flat steel products with high yield strength for cold forming, Technical Delivery Conditions.

EN 10338:2015, Hot-rolled and cold-rolled flat products without any coating on multiphase steels for cold forming, Technical Delivery Conditions.

VDA 239-100, Flat steel products for cold forming.

2.4 Delivery status
Cold-rolled strip is supplied in coils or sheets with a strip width ranging between 900 and 1750 mm. The strip thickness can range between 0.25 and 3.0 mm, depending on the intended application and customer specifications.

2.5 Base materials/Ancillary materials
The product is made from a steel slab produced at the Linz site of voestalpine Stahl GmbH. The steel slab is produced using crude steel comprising roughly 75 % crude iron and 25 % scrap.

Auxiliary materials/additives
- Corrosion protection oil
- Hydrochloric acid
- Sulfuric acid

This product contains substances listed in the *candidate list* (ECHA list of substances of very high concern (SVHC)) (14 July 2021) exceeding 0.1 percentage by mass: **No.**

This product contains other CMR substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass: **No.**

Biocide products were added to the construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) Ordinance on Biocide Products No. 528/2012): **No.**

2.6 Manufacture
The starting material for the production of cold-rolled strip is a steel slab produced using the primary route (blast furnace, LD steelmaking plant). The molten crude steel is cast into slabs using a continuous casting method. The cast slabs are reheated to between 900 and 1250 °C in a pusher-type or walking beam furnace and rolled in several rolling steps to form strips with a thickness ranging between 1.5 and 20 mm.
Prior to being rolled to the cold-rolled thickness, the hot-rolled strip with scale is pickled using hydrochloric or sulfuric acid. To adjust mechanical properties after cold rolling, the strip is annealed in the bell annealer or a continuous annealer and is then skin passed.

2.7 Environment and health during manufacturing
The Linz production site of the voestalpine Steel Division is certified according to *EMAS 2009, ISO 9001* and *ISO 14001*. In compliance with *EMAS* provisions, voestalpine continually publishes environment-related facts and figures pertaining to the production site. Investments are being made continually in the expansion of environmental protection measures at the Linz site in an effort to reduce air and water emissions to a minimum. Compliance with all statutory emission limits is verified. All production systems approved in accordance with applicable environmental impact analyses are inspected on a regular basis as part of environmental audits.

2.8 Product processing/Installation
Cold-rolled steel strip made by voestalpine can be further processed using conventional sheet treatments such as roll forming, deep drawing, edging, cold rolling, flanging, punching, mechanical and thermal cutting, welding and sand blasting. Protective measures (extraction, noise protection) prevent any emissions or other harmful effects from the declared product during such processing.

2.9 Packaging
The declared product is supplied in the form of coils or sheets. Packaging consists of paper (coated), steel straps (circumferential and axle hole straps) or cardboard sleeves and varies depending on the type of delivery transport. All packaging can be recycled in its entirety.

2.10 Condition of use
The declared product is cold-rolled steel strip. The declaration includes cold-rolled steel strip as the average product.

2.11 Environment and health during use
No adverse effects are expected on human health or the environment during use, nor are any harmful emissions expected from the declared product.

2.12 Reference service life
The referenced useful life depends on the respective application and generally lasts between 15 and 50 years.

2.13 Extraordinary effects

Fire
Not relevant.

Fire Protection

Name	Value
Building material class	A1
Burning droplets	Not relevant
Smoke gas development	Not relevant

Water
No negative effects are to be expected on the environment under the influence of water.

Mechanical destruction
Unforeseeable mechanical effects on the declared product would have no negative environmental impact because of the plasticity of steel.

2.14 Re-use phase
The declared product can be reused, recycled and reintroduced as a secondary raw material by recycling companies in the steel industry.

2.15 Disposal
The declared product can be entirely recycled. The waste code is in accordance with *European Waste Catalog (EWC): 17 04 05*. The type of waste is

equated with waste catalog code 35103 according to the Waste Catalog Ordinance applicable on a national level.

2.16 Further information

More information about the product is available on the web site at:
https://www.voestalpine.com/stahl/Produkte/Stahlbaender/Kaltgewalztes-Stahlband

3. LCA: Calculation rules

3.1 Declared Unit

This environmental product declaration refers to a declared unit of 1 ton of cold-rolled steel strip.

Declared unit

Name	Value	Unit
Declared unit	1	t
Conversion factor to 1 kg	0.001	-

For the calculation of the declared average, all grades produced were included, calculating an annual average. Input and production quantities for the entire calendar year 2019 were taken into account. The calculated results can thus be considered representative for the entire product portfolio of cold-rolled steel strips of voestalpine Stahl GmbH.

3.2 System boundary

The life cycle assessment of average cold-rolled steel strips refers to a cradle-to-gate analysis with modules C1–C4 and module D (A1–A3 + C + D). The following life cycle phases are part of the analysis:

Module A1–A3 | Production stage
The production stage includes the upstream burdens of purchased raw materials (coal, iron ore, pellets etc.), their transports and the manufacturing at the production site in Linz. Material and energy flows for the sinter plant, the coking plant, the blast furnaces, the steelworks, the hot strip mill, the pickling and the cold rolling are considered. Electricity is provided at Linz from a power station where process gases are used as fuel. Since more energy is used than is supplied by this company-owned power station, natural gas and electricity is additionally procured from Austrian networks. Scrap input in module A1–A3 is regarded as burden-free. Module A1–A3 also includes the production of the product packaging.

Module C1 | Deconstruction and demolition
It is assumed that the product is not connected with other materials and can therefore be dismantled. Dismantling efforts are considered negligible, thus no environmental impacts from the deconstruction of the products are declared.

Module C2 | Transport to disposal
For the transport to the disposal of the material, a distance of 50 km radius to the waste processing is assumed.

Module C3 | Waste processing
Product flows that reach Module D for recycling leave the product system in C3. Environmental impacts resulting from the grinding and sorting of steel scrap are not included since the expected environmental impact is considered negligible.

Module C4 | Landfilling
Module C4 declares the environmental impacts incurred by landfilling (5 % of the product).

Module D | Credits and loads beyond the system boundary
The potential for substituting primary steel with a recycling scenario (95 % of the product) is outlined in Module D.

3.3 Estimates and assumptions

All assumptions are verified through detailed documentation and correspond to the best possible representation of reality based on the available data. Regional applicability of the used background data refers to average data under European or German conditions taken from the *GaBi*-database. German data were used for the Austrian market whenever European or Austrian average data were not available.

3.4 Cut-off criteria

All inputs and outputs for which data are available are included in the LCA model. Data gaps are filled with conservative assumptions from average data (when available) or with generic data and are documented accordingly. Only data with a contribution of less than 1 % were cut off. Ignoring such data is justified based on the irrelevance of the expected effect. Processes, materials, or emissions known to make a significant contribution to the environmental effects of the products under examination have not been neglected. Data were collected from the models and recommendations developed by *worldsteel 2017* and tested using available comparable values. It is assumed that the data have been completely recorded and the overall total of ignored input flows do not amount to more than 5 % of total energy and mass flows. Environmental impacts of machines, plant and infrastructure were not included.

3.5 Background data

This study uses generic background data for the evaluation of upstream environmental impacts from *GaBi*-database 2021.1 and is modelled in *GaBi*-software version 10.

3.6 Data quality

The foreground data collected at voestalpine Stahl GmbH are based on the quantities used and volumes produced annually. All process data were collected by voestalpine in the course of reporting to official agencies. Data on material and energy use originate from material-specific throughput measurements of various processes as well as from controlling. Data were collected in compliance with *worldsteel 2017* provisions and were subjected to a supplementary plausibility check using material flow analyses of individual process steps. The technological, geographical and time-related representativeness of the data base was kept in mind when selecting background data. Whenever specific data were missing, either generic datasets or representative average data were used instead. The implemented *GaBi* background datasets are not more than ten years old.

3.7 Period under review

Foreground data were collected in the 2019 production year, and the data are based on the volumes produced on an annual basis.

3.8 Allocation

The primary data are allocated using the partitioning approach developed by *worldsteel 2014* for calculating life cycle inventories of co-products in steel production, which is in line with the provisions of *EN 15804*. The so-called partitioning approach provides for the allocation of environmental effects on the steelmaking process and the emerging byproducts based on physical relations. Material-inherent flow properties are thus taken into account.

The pickling byproducts iron sulphate and iron oxide were cut off as a result of their low contribution to company revenue. Economic allocation is not considered suitable since the byproducts and co-products are not directly tradable goods. Furthermore, long-term contracts for the sale of the byproducts exist, and the negotiated prices are therefore not subject to market dynamics.

3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account.

The GaBi background database was used to calculate the LCA (GaBi 10; 2021.1).

4. LCA: Scenarios and additional technical information

Characteristic product properties
Information on biogenic Carbon
The declared product does not contain any biogenic carbon.

Installation in building (A5)
The end-of-life of the packaging materials is not declared in Module A5.

Name	Value	Unit
Packaging (Paper)	0.0012	kg
Packaging (Steel strips)	0.0002	kg

The end-of-life scenario used in this LCA study is based on the following assumptions and thus complies with the specifications published in *ökobaudat 2021*:

End-of-life (C1–C4)

Name	Value	Unit
Collected separately (Steel)	1000	kg
Recycling 95 %	950	kg
Landfilling 5 %	50	kg

Re-Use, recovery and recycling potential (D), relevant scenario information

Name	Value	Unit
Net flow of steel scrap	815	kg

This scenario contains a recycling rate of 95 %. Since voestalpine externally purchases scrap for steel production, this is offset against the steel scrap for recycling (net flow).

5. LCA: Results

The following table contains the LCA results for a declared unit of 1 ton cold-rolled steel strip.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	MNR	MNR	MNR	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 ton cold-rolled steel strip

Core Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Global warming potential - total	[kg CO_2-Eq.]	2.19E+3	0.00E+0	3.02E+0	0.00E+0	2.42E+0	-1.38E+3
Global warming potential - fossil fuels	[kg CO_2-Eq.]	2.19E+3	0.00E+0	3.00E+0	0.00E+0	2.44E+0	-1.38E+3
Global warming potential - biogenic	[kg CO_2-Eq.]	4.06E+0	0.00E+0	-3.56E-3	0.00E+0	-2.50E-2	-8.95E-1
GWP from land use and land use change	[kg CO_2-Eq.]	7.31E-1	0.00E+0	2.44E-2	0.00E+0	2.44E-3	2.00E-1
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	5.96E-11	0.00E+0	5.90E-16	0.00E+0	5.77E-15	-2.30E-12
Acidification potential, accumulated exceedance	[mol H^+-Eq.]	4.61E+0	0.00E+0	9.92E-3	0.00E+0	7.78E-3	-2.48E+0
Eutrophication, fraction of nutrients reaching freshwater end compartment	[kg P-Eq.]	2.19E-3	0.00E+0	8.88E-6	0.00E+0	1.86E-6	-2.83E-4
Eutrophication, fraction of nutrients reaching marine end compartment	[kg N-Eq.]	9.60E-1	0.00E+0	4.55E-3	0.00E+0	1.93E-3	-3.70E-1
Eutrophication, accumulated exceedance	[mol N-Eq.]	1.04E+1	0.00E+0	5.08E-2	0.00E+0	2.12E-2	-3.60E+0
Formation potential of tropospheric ozone photochemical oxidants	[kg NMVOC-Eq.]	3.37E+0	0.00E+0	8.94E-3	0.00E+0	6.08E-3	-1.89E+0
Abiotic depletion potential for non-fossil resources	[kg Sb-Eq.]	1.89E-3	0.00E+0	2.65E-7	0.00E+0	1.68E-7	-3.01E-3
Abiotic depletion potential for fossil resources	[MJ]	1.85E+4	0.00E+0	3.98E+1	0.00E+0	3.56E+1	-1.20E+4
Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	[m^3 world-Eq deprived]	6.69E+1	0.00E+0	2.77E-2	0.00E+0	-2.89E-2	-2.71E+2

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 ton cold-rolled steel strip

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as energy carrier	[MJ]	1.03E+3	0.00E+0	2.29E+0	0.00E+0	2.57E+0	1.11E+3
Renewable primary energy resources as material utilization	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Total use of renewable primary energy resources	[MJ]	1.03E+3	0.00E+0	2.29E+0	0.00E+0	2.57E+0	1.11E+3
Non-renewable primary energy as energy carrier	[MJ]	1.86E+4	0.00E+0	4.00E+1	0.00E+0	3.56E+1	-1.20E+4
Non-renewable primary energy as material utilization	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Total use of non-renewable primary energy resources	[MJ]	1.86E+4	0.00E+0	4.00E+1	0.00E+0	3.56E+1	-1.20E+4
Use of secondary material	[kg]	1.35E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.15E+2
Use of renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of non-renewable secondary fuels	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Use of net fresh water	[m^3]	4.65E+0	0.00E+0	2.62E-3	0.00E+0	3.67E-4	-6.09E+0

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 ton cold-rolled steel strip

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	[kg]	5.60E-6	0.00E+0	2.11E-9	0.00E+0	6.30E-9	3.35E-6
Non-hazardous waste disposed	[kg]	2.51E+1	0.00E+0	6.27E-3	0.00E+0	5.01E+1	1.45E+2
Radioactive waste disposed	[kg]	1.24E-1	0.00E+0	7.25E-5	0.00E+0	4.05E-4	4.35E-4
Components for re-use	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for recycling	[kg]	0.00E+0	0.00E+0	0.00E+0	9.50E+2	0.00E+0	0.00E+0
Materials for energy recovery	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported electrical energy	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported thermal energy	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 ton cold-rolled steel strip

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Potential incidence of disease due to PM emissions	[Disease Incidence]	ND	ND	ND	ND	ND	ND
Potential Human exposure efficiency relative to U235	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
Potential comparative toxic unit for ecosystems	[CTUe]	ND	ND	ND	ND	ND	ND
Potential comparative toxic unit for humans - cancerogenic	[CTUh]	ND	ND	ND	ND	ND	ND
Potential comparative toxic unit for humans - not cancerogenic	[CTUh]	ND	ND	ND	ND	ND	ND
Potential soil quality index	[-]	ND	ND	ND	ND	ND	ND

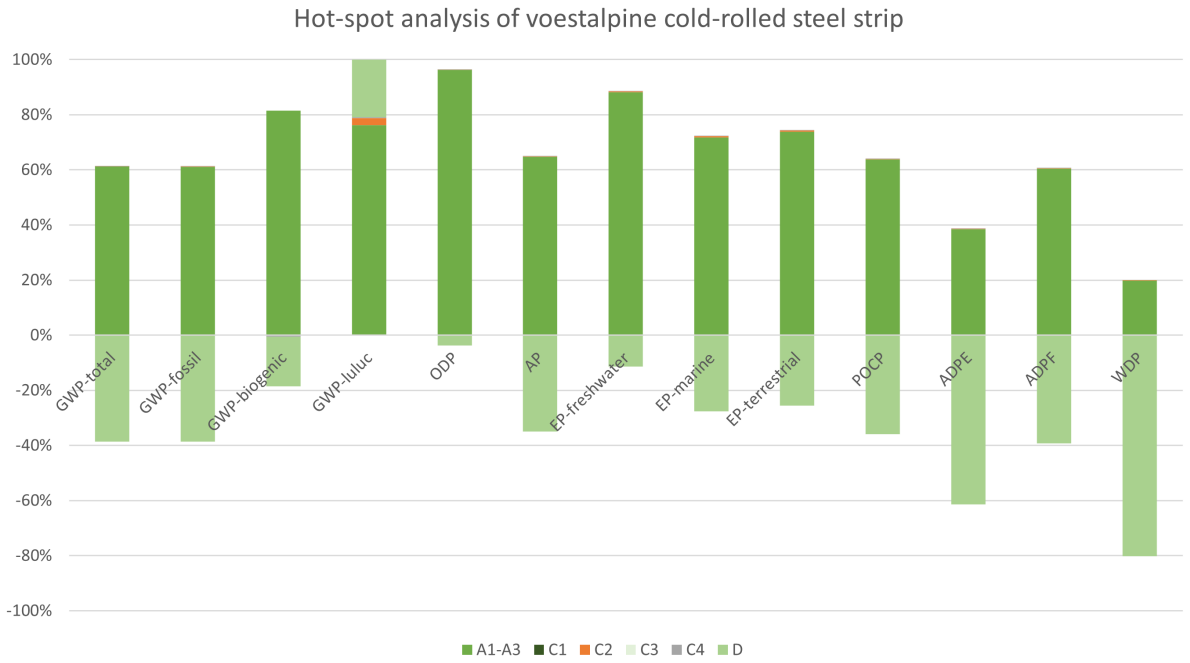
The additional and optional impact categories according to *EN 15804+A2* are not declared, as this is not required according to *PCR Part A*.

Disclaimer 1 – for the indicator potential human exposure efficiency relative to U235: 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 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.

Disclaimer 2 – for the indicators abiotic depletion potential for non-fossil resources, abiotic depletion potential for fossil resources, water (user) deprivation potential, deprivation-weighted water consumption, eutrophication - fraction of nutrients reaching freshwater end compartment, potential comparative toxic unit for humans - cancerogenic, potential comparative toxic unit for humans - not cancerogenic, potential soil quality index: The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

6. LCA: Interpretation

The following interpretation contains a summary of the LCA results referenced to a declared unit of 1 ton cold-rolled steel strip.



A comparison of the individual lifecycle phases results in a clear dominance of the production phase (Modules A1–A3). The environmental effects in the production phase are mainly dominated by the direct process emissions of steel production and the supply chain of purchased raw materials and energy carriers.

As a result of product recyclability, the material removed at the end of life can substitute primary steel. Module D shows the recycling potential of steel at the end of its product life. This results in credits from the substitution of primary steel.

The environmental impact of the transport of the products to recycling (C2) as well as landfilling of the losses at the end of life (C4) represents a minor contribution to the overall environmental impact of the product.

In summary, raw material input and energy carriers required in the production phase as well as direct

emissions at the site can be identified as important factors in the environmental impact of cold-rolled steel strips. The greenhouse gases directly emitted from the processes at the Linz production site, especially from the blast furnaces and the energetic treatment of the metallurgical gases in the network, contribute to a large share to potential global warming.

The cold-rolled strip mill contributes about 1 % to the environmental impacts considered, with the exception of potential fossil fuel resource depletion (ADPF), with a contribution of about 4 %.

In the declared average of this EPD, all produced grades were included declaring a representative average. The analysis of different specifications of cold-rolled steel strips identifies a variation of the product-related carbon footprint of < 10 %. For eutrophication and formation potential of tropospheric ozone photochemical oxidants, this interval amounts to a maximum of 40 %. The elemental resource use, potential acidification and water scarcity vary greatly depending on the alloying elements used and their share in the product. Therefore, larger deviations in these indicators are to be expected depending on the respective product specification.
Due to the homogeneous structure of the products, the environmental impact of the products correlates directly with their mass.

7. Requisite evidence

Not relevant for this EPD

8. References

Standards

EN 10130
EN 10130:2007, Cold rolled flat products of mild steels for cold forming, Technical Delivery Conditions.

EN 10209
EN 10209:2013, Cold-rolled flat products made of mild steels for enameling, Technical Delivery Conditions.

EN 10268
EN 10268:2013, Cold-rolled flat steel products with high yield strength for cold forming, Technical Delivery Conditions.

EN 10338
EN 10338:2015, Hot-rolled and cold-rolled flat products without any coating on multiphase steels for cold forming, Technical Delivery Conditions.

VDA 239-100
VDA 239-100, Flat steel products for cold forming.

EN 15804
EN 15804:201204+A2: 2019, Sustainability of construction works - Environmental Product Declarations - Core rules for the product category of construction products.

ISO 9001
DIN EN ISO 9001:2015, Quality management systems - Requirements.

ISO 14001
DIN EN ISO 14001:2015, Environmental management systems Requirements with guidance for use.

ISO 14025
DIN EN ISO 14025:2011-10, Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

ISO 14044
DIN EN ISO 14044:2006-10, Environmental management - Life cycle assessment - Requirements and guidelines.

Further references

Waste Catalog Ordinance
BMLFUW 2003. Ordinance of the Federal Minister for Agriculture and Forestry, the Environment and Water Resources (Federal Legal Gazette II No. 570/2003) regarding a waste catalog (Waste Catalogue Ordinance).

Candidate List
Candidate List of Substances of Very High Concern (ECHA Candidate List) of 02.12.2020, published in accordance with Article 59 (10) of the REACH Regulation Helsinki: European Chemicals Agency.

EMAS 2009
Regulation (EC) No 1221/2009 of the European Parliament and of the Council of 25 November 2009 on the voluntary participation by organisations in a community ecomanagement and audit scheme (EMAS).

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Product category rules for building-related products and services. Part A: Calculation rules for the life cycle assessment and requirements on the project report according to EN15804+A2:2019. Version 1.2 , Berlin: Institut Bauen und Umwelt e.V. (Hrsg.), 2021.

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Product category rules for buildingrelated products and services. Part B: Requirements of the EPD for Structural steels. Version 1.6, 30.11.2017.

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World Steel Association, 14. Februar 2014: A methodology to determine the LCI of steel industry co-products.

worldsteel 2017
World Steel Association, 2017: Life cycle inventory methodology report.

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