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-20220020-IBA1-EN
Issue date	05.04.2022
Valid to	04.04.2027

Hot-dip galvanized steel strip
voestalpine Stahl GmbH

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

www.ibu-epd.com | https://epd-online.com

1. General Information

voestalpine Stahl GmbH	Hot-dip galvanized 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-20220020-IBA1-EN	**Declared product / declared unit** 1 ton of average hot-dip galvanized 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 average hot-dip galvanized steel strip produced at the production site in Linz.
Issue date 05.04.2022	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 04.04.2027	**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.-Ing. Andreas Ciroth (Independent verifier)
 Dr. Alexander Röder (Managing Director Institut Bauen und Umwelt e.V.))	

2. Product

2.1 Product description/Product definition

Hot-dip galvanized steel strip made by voestalpine Stahl GmbH is a steel strip produced using the blast furnace route, with a zinc or zinc-magnesium coating, and a surface treatment as requested by the customer, such as oiling. Low-alloy mild steels, press-hardening steels, and higher-strength multiphase 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 hot-dip galvanized steel strip are found in several industrial sectors that are divided into the following segments:

- Household-appliance industry
- House Technology
- Roof, cladding, drainage
- Section industry
- Tube and section industry
- Commercial vehicle industry
- Automotive supply industry
- Automotive

The hot-dip galvanized steel strip of voestalpine is supplied with various zinc, zinc-magnesium or zinc-iron coatings and with a wide range of surface conditions. By additional surface treatment steps, including oiling, passivation or anti-fingerprint systems, the declared product features high corrosion protection and very good processing properties (e.g. for rolling, deep drawing etc.).

2.3 Technical Data

The data listed in the declaration of performance are authoritative:

Structural Data

Name	Value	Unit
Sheet thickness	0.4 - 4.0	mm
Surface weight	2.8 - 27.8	kg/m²

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to:

DIN EN 10346:2015, Continuously hot-dip coated steel flat products for cold forming - Technical delivery conditions.

DIN EN 10143:2006, Continuously hot-dip coated steel sheet and strip - Tolerances on dimensions and shape.

VDA Werkstoffblatt 239-100, 2016, Sheet Steel for Cold Forming.

2.4 Delivery status

The hot-dip galvanized steel strip is supplied in coils with a strip width ranging between 900 and 1740 mm. The steel strip thickness can vary between 0.4 and 4 mm, depending on the intended application and customer specifications.

2.5 Base materials/Ancillary materials

The starting product for hot-dip galvanized steel strip is a hot-rolled or cold-rolled steel strip produced on site at voestalpine Stahl GmbH. The basic material is produced of crude steel comprising roughly 75 % crude iron and 25 % scrap.

Auxiliary materials/additives

- Zinc coating: > 99 % Zn
- Corrender zinc-magnesium coating: 96 % Zn; 1.5 % Mg; 2.5 % Al
- Zinc-iron coating: 12% Fe max
- Corrosion protection oil: 0.5 – 2.0 g/m
- Surface treatments (including passivation agents)

The product for authorization contains substances on the *ECHA list* of substances of very high concern (SVHC) (14 July 2021) above 0.1% by mass: **No.**

The product contains further CMR substances of category 1A or 1B that not in the candidate list, above 0.1 mass % in at least one sub-product: **No.**

Biocides have been added to the construction product, or the product has been treated with biocides (a treated product pursuant to the Biocidal Product Regulation (EU) No. 528/2012): **No.**

2.6 Manufacture

The starting material for the production of hot-rolled steel 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.
A layer of mill scale forms on the hot-rolled steel strip that is mechanically removed before being further processed (descaling on a stretch leveler). This production step initially features a mechanical loosening of the scale layer (stretch leveler). Subsequently, the steel strip is pickled using hydrochloric and sulfuric acid. After being pickled, the strip is rinsed, dried and oiled.
The pickled hot strip is hot-dip galvanized up to a thickness of 4 mm or further processed in the cold-rolling mill of voestalpine. The steel strip can be rolled to thicknesses between 0.4 and 3 mm. The material is heat-treated (continuous annealing process) to restore the formability of the steel strip or to produce a material with certain properties. This heat treatment is carried out in combination with a hot-dip process for surface finishing in the hot-dip galvanizing facilities of voestalpine. Surface finishing with metallic coating (zinc, zinc-magnesium or zinc-iron) provides cathodic corrosion protection on the steel strip.

2.7 Environment and health during manufacturing

The Linz production site of the voestalpine Steel Division is certified pursuant 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

Hot-dip galvanized steel strip made by voestalpine can be further processed using conventional methods such as roll forming, deep drawing, edging etc. No Emissions or other harmful effects occur during the processing of the declared product.

2.9 Packaging

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

2.10 Condition of use

The declared product is a high-quality steel strip that has been hot-dip galvanized, being a corrosion-resistant material. The declaration refers to a product made of steel strip coated with a zinc coating with an average thickness of roughly 133 g/m².

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
Hot-dip galvanized steel strip made by voestalpine consists of a cold-rolled or hot-rolled steel strip and a metallic finish coating. 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 to be equated with waste catalog code 35103 pursuant to the *Waste Catalog Ordinance* applicable on a national level.

2.16 Further information
Please find more information about the product on our website at:
https://www.voestalpine.com/stahl/en/Products/Steel-strips/Hot-dip-galvanized-steel-strip

3. LCA: Calculation rules

3.1 Declared Unit
This environmental product declaration refers to a declared unit of 1 ton of hot-dip galvanized 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 in the form of 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 hot-dip galvanized steel strip of voestalpine Stahl GmbH.

3.2 System boundary
The life cycle assessment of average hot-dip galvanized steel strip refers to a cradle-to-gate analysis with modules (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, pickling, cold rolling as well as hot-dip galvanizing including post treatment 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. 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. Associated efforts are negligible, no environmental impacts from the deconstruction of the products are declared.

Module C2 | Transport to disposal
The transport to the disposal of the material is estimated declaring a 50 km radius to the waste processing.

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 due to the negligible expected environmental impact.

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. The composition of the galvanizing and the post-treatment of the steel strip reflects the majority of the systems used and can thus be considered representative.

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 due to lack of relevance 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 coproducts 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 to be expedient because byproducts and co-products are not tradable goods, directly. 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	813	kg

This scenario contains a recycling rate of 95 %. Since voestalpine externally purchases scrap for steelproduction, 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 hot-dip galvanized 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 hot-dip galvanized steel strip

Core Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Global warming potential - total	[kg CO_2-Eq.]	2.35E+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.]	2.34E+3	0.00E+0	3.00E+0	0.00E+0	2.44E+0	-1.38E+3
Global warming potential - biogenic	[kg CO_2-Eq.]	5.25E+0	0.00E+0	-3.56E-3	0.00E+0	-2.50E-2	-8.93E-1
GWP from land use and land use change	[kg CO_2-Eq.]	7.94E-1	0.00E+0	2.44E-2	0.00E+0	2.44E-3	1.99E-1
Depletion potential of the stratospheric ozone layer	[kg CFC11-Eq.]	6.12E-11	0.00E+0	5.90E-16	0.00E+0	5.77E-15	-2.30E-12
Acidification potential, accumulated exceedance	[mol H^+-Eq.]	4.92E+0	0.00E+0	9.92E-3	0.00E+0	7.78E-3	-2.47E+0
Eutrophication, fraction of nutrients reaching freshwater end compartment	[kg P-Eq.]	2.68E-3	0.00E+0	8.88E-6	0.00E+0	1.86E-6	-2.82E-4
Eutrophication, fraction of nutrients reaching marine end compartment	[kg N-Eq.]	1.03E+0	0.00E+0	4.55E-3	0.00E+0	1.93E-3	-3.69E-1
Eutrophication, accumulated exceedance	[mol N-Eq.]	1.12E+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.]	3.57E+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.]	6.61E-2	0.00E+0	2.65E-7	0.00E+0	1.68E-7	-3.00E-3
Abiotic depletion potential for fossil resources	[MJ]	2.08E+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]	8.93E+1	0.00E+0	2.77E-2	0.00E+0	-2.89E-2	-2.70E+2

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

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as energy carrier	[MJ]	1.42E+3	0.00E+0	2.29E+0	0.00E+0	2.57E+0	1.10E+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]	1.42E+3	0.00E+0	2.29E+0	0.00E+0	2.57E+0	1.10E+3
Non-renewable primary energy as energy carrier	[MJ]	2.09E+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]	2.09E+4	0.00E+0	4.00E+1	0.00E+0	3.56E+1	-1.20E+4
Use of secondary material	[kg]	1.37E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	8.13E+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]	5.45E+0	0.00E+0	2.62E-3	0.00E+0	3.67E-4	-6.07E+0

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

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	[kg]	6.33E-6	0.00E+0	2.11E-9	0.00E+0	6.30E-9	3.35E-6
Non-hazardous waste disposed	[kg]	2.79E+1	0.00E+0	6.27E-3	0.00E+0	5.01E+1	1.44E+2
Radioactive waste disposed	[kg]	2.18E-1	0.00E+0	7.25E-5	0.00E+0	4.05E-4	4.34E-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 hot-dip galvanized 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

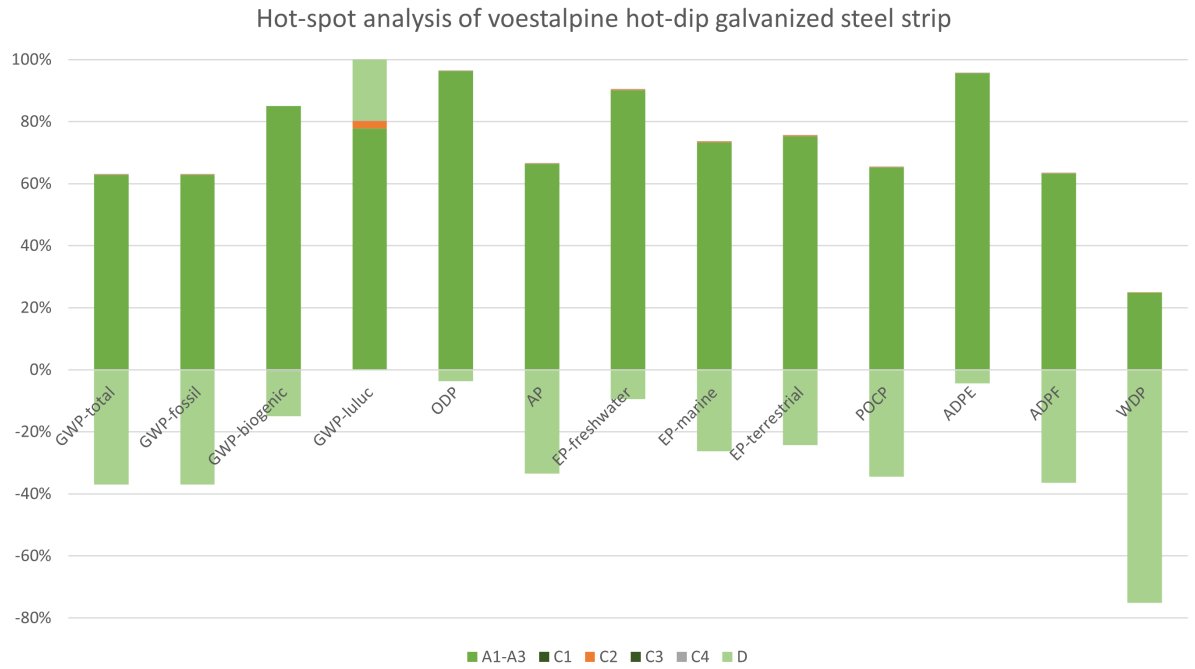
The additional and optional impact categories according to *EN 15804+A2* are not declared, as this is not required according to *PCR Part A*.

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 hot-dip galvanized 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 hot-dip galvanized 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. In the environmental profile of the hot-dip galvanizing process, the production of the zinc coating as well as the natural gas input play a major role.

Hot-dip galvanizing contributes about 6 % to the carbon footprint (GWP), potential acidification (EP) and potential eutrophication of marine and terrestrial ecosystems (EP-marine & EP-terrestrial), with emissions from natural gas combustion as most important driver.
In terms of potential freshwater eutrophication (EP-freshwater) and potential contribution to water scarcity (WDP), the share of hot-dip galvanizing is around 20 %, and results mainly from the production of the zinc coating. The abiotic depletion potential for non-fossil resources (ADPE) is almost entirely (97 %) depending on the zinc layer.

In the declared average of this EPD, all produced grades were included in the form of a representative average. The analysis of different specifications of hot-dip galvanized steel strips identifies a variation of the product-related carbon footprint of ± 10 %. For potential acidification, eutrophication and formation potential of tropospheric ozone photochemical oxidants, this interval is up to ± 30-40 %. This variance is mainly influenced by the alloying elements used, and their share in the product.

Due to the homogeneous structure of the products, the environmental impact of the products correlates directly with their mass. This implies a slight imprecision for the galvanization as these layers are not scalable linearly but surface-related and are dependent on the variation of their thickness on the respective product.

The results of the previous EPD (EPD-VOE-20190048-IBC1-EN) are not directly comparable with the present updated version due to the update of the underlying methodology according to *EN 15804+A2*.

7. Requisite evidence

Not relevant for this EPD.

8. References

Standards

DIN EN 10346
DIN EN 10346:2015, Continuously hot-dip coated steel flat products for cold forming - Technical delivery conditions.

DIN EN 10143
DIN EN 10143:2006, Continuously hot-dip coated steel sheet and strip - Tolerances on dimensions and shape.

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.

VDA Werkstoffblatt 239-100
VDA Werkstoffblatt 239-100: 2016 Sheet Steel for Cold Forming.

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).

GaBi
GaBi 10, Software-System and Database for Life Cycle Engineering. DB v8.7 2021.1. Sphera, 1992-2021. Available at: http://documentation.gabi-software.com.

IBU 2021
Institut Bauen und Umwelt e.V.: General Programme Instructions for the preparation of EPDs at the Institut

Bauen und Umwelt e.V., Version 2.0 Institut Bauen und Umwelt e.V.,2021, Berlin. www.ibuepd. com.

ökobaudat 2021
ökobaudat 2021. EN 15804 and BNB compliant data for more than 700 building products. Federal Ministry of the Interior, Building and Community.

PCR Part A
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.

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

worldsteel 2014
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.

Publisher
Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Tel +49 (0)30 3087748- 0
Fax +49 (0)30 3087748- 29
Mail info@ibu-epd.com
Web **www.ibu-epd.com**

Programme holder
Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Tel +49 (0)30 - 3087748- 0
Fax +49 (0)30 – 3087748 - 29
Mail info@ibu-epd.com
Web **www.ibu-epd.com**

Author of the Life Cycle Assessment
Daxner & Merl GmbH
Schleifmühlgasse 13/24
1040 Wien
Austria

Tel +43 676 849477826
Fax +43 42652904
Mail office@daxner-merl.com
Web **www.daxner-merl.com**

Owner of the Declaration
voestalpine AG
voestalpine-Straße 3
4020 Linz
Austria

Tel +43/50304/15-0
Fax +43/50304/55-0
Mail info@voestalpine.com
Web **www.voestalpine.com**