ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	Salzgitter AG
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-SAL-20230561-IBA1-EN
Issue date	30.01.2024
Valid to	29.01.2029

Hot-dip galvanised cold-rolled sheet incl. StronSal® made from scrap-based electrical steel

Salzgitter Flachstahl GmbH

Institut Bauen und Umwelt e.V.

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1. General Information

Salzgitter Flachstahl GmbH

Programme holder

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

Declaration number

EPD-SAL-20230561-IBA1-EN

This declaration is based on the product category rules:

Structural steels, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

30.01.2024

Valid to

29.01.2029

Dipl.-Ing. Hans Peters
(Chairman of Institut Bauen und Umwelt e.V.)

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

Hot-dip galvanised cold-rolled sheet incl. StronSal® made from scrap-based electrical steel

Owner of the declaration

Salzgitter AG
Eisenhüttenstraße 99
38239 Salzgitter
Germany

Declared product / declared unit

1 tonne of hot-dip galvanised cold-rolled sheet made from scrap-based electrical steel

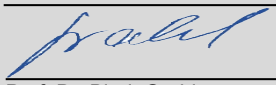
Scope:

This Environmental Product Declaration refers to one tonne hot-dip galvanised cold-rolled sheet manufactured by Salzgitter Flachstahl GmbH, whose slab input material is produced using a scrap-based electric arc furnace route.
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*.

Verification

The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025:2011
☐ internally ☒ externally



Prof. Dr. Birgit Grahl,
(Independent verifier)

2. Product

2.1 Product description/Product definition

This EPD describes the environmental impacts of all hot-dip galvanised cold-rolled products from Salzgitter Flachstahl GmbH, including the StronSal® product group. The steel products are based on primary material that is produced via a scrap-based electric arc furnace route.
(EU) Directive No. 305/2011 (CPR) applies for placing the product on the market in the EU/EFTA (with the exception of Switzerland).

2.2 Application

The areas of application for hot-dip galvanised cold-rolled products including StronSal® from Salzgitter Flachstahl GmbH include the following:

- Automobile and automotive industry
- Domestic appliance industry
- Construction industry (roof and wall profiles)
- Ventilation and drainage technology
- Building services
- Shelving and switch cabinet construction
- Furniture industry

2.3 Technical Data

This EPD covers all hot-dip coated products in various steel grades, dimensions, shapes and delivery states. The quality-specific information on tolerance specifications can be found in the corresponding standards (e.g. *EN 10346* and *EN 10143*). The respective information in the Declaration of Performance also applies:

Technical construction data

Name	Value	Unit
Density	7850	kg/m^3
Modulus of elasticity	210000	N/mm^2
Coefficient of thermal expansion	11	$10^{-6}K^{-1}$
Thermal conductivity	48	W/(mK)
Melting point	1535	°C
Minimum yield strength (steel sheet)	165	N/mm^2
Minimum tensile strength (steel sheet)	270	N/mm^2
Minimum elongation (steel sheet)	14	%

The product's performance values correspond with the Declaration of Performance in terms of its essential properties in accordance with *DIN EN 10346:2015-10*, Continuously hot-dip coated steel flat products for cold forming – Technical delivery conditions.

- *DIN EN 10143:2006-9*, Continuously hot-dip coated sheet steel and strip – Tolerances on dimensions and shape
- *VDA 239-100*, Flat steel products for cold-forming

The technical parameters from the standards are ensured on the basis of *ISO 9001*.

2.4 Delivery status

Salzgitter Flachstahl GmbH products are supplied as coils in strip widths between 900 and 1860 mm. The thicknesses vary between 0.4 and 4 mm, depending on the application.

2.5 Base materials/Ancillary materials

The declared hot-dip galvanised cold-rolled sheet consists almost entirely of steel, which is produced using a scrap-based electric arc furnace route and coated with a thin layer of zinc in a hot-dip process. The specific composition depends on the steel grade and the area of application and can be found in the material data sheets under Material data sheets.

The product / At least one sub-product contains substances from the ECHA list of candidates of Substances of Very High Concern (SVHC) (January 2022) exceeding 0.1 percentage by mass: **no**

The product / At least one sub-product contains other CMR substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1% by mass in at least one sub-product: **no**

Biocide products were added to this 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 hot-dip galvanised cold-rolled sheets are slabs that are produced via a scrap-based electric steel route. The slabs are heated to temperatures of between 1000 °C and 1200 °C for further processing, rolled out into so-called hot strips, pickled in hydrochloric acid and then rolled out again to the desired final thickness. The strips are then recrystallisation annealed to adjust their mechanical properties and coated with a zinc/aluminium or zinc/aluminium/magnesium alloy in a hot-dip process to provide cathodic protection against corrosion.

2.7 Environment and health during manufacturing

The integrated management system at Salzgitter Flachstahl GmbH includes the quality management systems in accordance with *ISO 9001* and *ISO 14001*. The occupational safety and energy management systems meet the requirements of the international standards *ISO 45001* and *ISO 50001*. Supported by continuous investment in environmental protection measures emissions to air and water are kept to a minimum. Legal requirements are complied with and in many cases significantly undercut. All operating facilities are periodically inspected by the authorities to ensure environmental (see also *SZFG*) compatibility.

2.8 Product processing/Installation

Depending on the area of application, the further processing of hot-dip galvanised cold-rolled sheet includes all common sheet metal processing methods, such as forming, edging, welding, cutting or painting.

2.9 Packaging

Packaging varies depending on the order. Hot-dip galvanised cold-rolled sheet is either packaged in corrosion-inhibiting paper (VCI paper) or delivered unpackaged and in compliance with statutory transport safety regulations.

2.10 Condition of use

If used for its intended purpose, no change is to be expected with regard to the material quality during use. Maintenance and inspection times depend on the design of the material and the place of use.

2.11 Environment and health during use

In connection with the intended use of the steel products, there are no known effects on human and animal health or harmful emissions into air, soil or water.

2.12 Reference service life

A general reference service life is not declared for hot-dip galvanised cold-rolled sheet, as the service life of the products differs greatly due to the variety of applications.

As a rule, the service life is limited by the user's maintenance intervals.

2.13 Extraordinary effects

Fire

Hot-dip galvanised cold-rolled sheets are non-flammable according to *EN 1350*1. No flammable gases or vapours escape. The fire resistance depends strongly on the area of application and the load.

Fire protection

Name	Value
Building material class	A1
Burning droplets	d0
Smoke gas development	s1

Water

Under the influence of water, no negative consequences for the environment are to be expected due to the low solubility of steel in water. In combination with oxygen and water, steel can corrode.

Mechanical destruction

Unforeseeable mechanical impacts on the declared product have no consequences for the environment due to the plastic deformability of steel.

2.14 Re-use phase

Hot-dip galvanised cold-rolled sheets are 100% recyclable and can either be reused directly or fed back into the steel industry as a valuable secondary raw material via recycling companies. Steel is a permanent material that can be recycled as often as desired.

2.15 Disposal

The declared product can be fully returned to the life cycle as a secondary raw material. The waste code according to the European Waste Catalogue is: 17 04 05. The waste type is to be equated with the code number 35103 according to the nationally valid Waste Catalogue Ordinance.

2.16 Further information

Further information is available at: https://www.salzgitter-flachstahl.de/de/produkte/feuerverzinkte-produkte.html.

3. LCA: Calculation rules

3.1 Declared Unit

This Environmental Product Declaration refers to the declared unit of one tonne of hot-dip galvanised cold-rolled sheet manufactured by Salzgitter Flachstahl GmbH, whose slab input material is produced using a scrap-based electric arc furnace route.

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	t
Density	7850	kg/m^3
Thickness Min.	0,4	mm
Thickness Max.	4	mm

Other declared units are allowed if the conversion is shown transparently.

The average analysis in this EPD includes all input and production quantities of Salzgitter Flachstahl GmbH for the calendar year 2022 and the expenses of the slab supplier Peiner Träger GmbH for the year 2021. For this reason, the results of this EPD are representative for hot-dip galvanised cold-rolled products from Salzgitter Flachstahl GmbH, whose slab input materials are produced via a scrap-based electric arc furnace route.

3.2 System boundary

This Environmental Product Declaration is a 'Cradle to gate" EPD with modules C1-C4 and module D.

Modules A1–A3: Product stage

The raw material supply stage in module A1 includes the expenses for the provision of materials and energy for the production of steel slabs and their further processing into hot-dip galvanised cold-rolled sheets. In almost all cases, the costs for the production and transport of raw materials are mapped using the LCI database of the Gabi 10 software. Module A2, on the other hand, includes expenses for internal plant material logistics, slab transport between the production sites, and scrap transport. Finally, module A3 contains the direct process emissions of slab production and further processing.

Module C1 | Deconstruction / Demolition

At the beginning of the disposal stage, the steel products are generally not combined with other materials and can be dismantled by type. The costs associated with dismantling are therefore estimated to be low and negligible.

Module C2 | Transport

An average distance of 100 km by truck is assumed as a representative scenario for waste management transport.

Module C3 | Waste treatment

It is assumed that the steel products are shredded before recycling.

Module C4 | Disposal

Residual materials are not landfilled, as steel is completely recycled.

Module D | Benefits and loads beyond the system boundary

Module D shows the environmental impacts according to the selected end-of-life scenario (91.6% recycling, 5.3% reuse, 3.1% loss).

3.3 Estimates and assumptions

All assumptions are supported by detailed documentation and are based on real production data (see section 3.2). Where no primary data was available, the data sets were supplemented using the LCI database contained in *GaBi 10*. The transport costs are modelled using conservative assumptions and the disposal scenario is based on the results of a study by *Helmus*. Possible credits or debits from steel recycling at the end of the life cycle are mapped in accordance with the modelling methodology according to *worldsteel 2017* and *ISO 14040*.

3.4 Cut-off criteria

The End-of-Life scenario involves steel losses of 3.1%. Landfilling is not considered. The use of lubricants is neglected in steel production.
In their entirety, these unconsidered flows significantly comply with the cut-off criterion of max. 5% of energy and mass expenditure while also adhering to the criterion of 1% in relation

to individual processes, (*PCR, Part A*).
The production of capital goods, equipment and infrastructure required for the manufacturing process were not taken into account.

3.5 Background data

The primary process data used for the modelling of slab production and its further processing into hot-dip galvanised cold-rolled sheets originates from data collected by Peiner Träger GmbH and Salzgitter Flachstahl GmbH as well as verified operating reports. The LCA calculations were carried out using the LCA for Experts life cycle assessment software and the LCI database for upstream chain emissions it contains (*GaBi 10*; database version 2023.1, software version 10.7.0.183).

3.6 Data quality

All primary production data for slab production and its further processing into hot-dip galvanised cold-rolled sheets originates from the 2021 and 2022 financial years and is mainly based on data collected for official or commercial reporting obligations. These annual volumes were examined for plausibility. The evaluation model of the EU's 'Product Environmental Footprint' approach (see *PEF 2012*) was used to assess the data quality of the primary data. Accordingly, the overall quality of the primary data can be rated as 'very good'. The evaluation of the secondary data sets from the *GaBi 10* database, on the other hand, is carried out by Sphera and can be viewed on its website. When selecting the background data, care is taken to ensure the technological, geographical and time-related representativity of the data basis.

3.7 Period under review

The periods under review are the 2021 and 2022 financial years.

3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Germany

3.9 Allocation

Where possible, allocations are avoided in accordance with *EN 15804* and *PCR, Part A*. Instead, the environmental impacts of co-products and by-products are modelled in accordance with the *ISO 14044* recommendation using system space expansion. The method used is based on the methodology published by *worldsteel 2017*. The total process loads are allocated to the main products and credits are allocated to the by-products if their use avoids the production of materials with an analogous function. Deviating from this, an economic allocation is carried out for granulated blast furnace slag in accordance with *PCR, Part B.*
The allocation procedures for reuse and recycling are based on the quantitative assumptions for recycling, reuse and loss of steel scrap from *Helmus*. Steel scrap generated during the production stage is returned to module A1 unencumbered, with the environmental impact of the entire secondary raw material resulting from the calculation of the net scrap quantity used in accordance with the methodology of *worldsteel 2017* and *ISO 14040*.

3.10 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 underlying database used is the LCA for Experts software package from Sphera (*GaBi 10*; database version 2023.1, software version 10.7.0.183).
As shown in section 2.6, the slab input material for the production of hot-dip galvanised cold-rolled sheet is produced via a scrap-based electric arc furnace route, whereby large amounts of electrical energy are used to melt down the steel scrap. If electrical energy from wind power is used for melting and further processing, the process-related emissions can be significantly reduced.

It is possible to purchase hot-dip galvanised cold-rolled sheets from Salzgitter Flachstahl GmbH that are produced exclusively with electrical energy from wind power throughout the entire production route (electric arc furnace + further processing). The following table summarises the corresponding EN 15804 core indicators for assessing the environmental impact of this production variant. A complete list can be found in the annex to this EPD.

LCA RESULTS – ENVIRONMENTAL IMPACTS acc. to EN 15804+A2: 1 tonne of hot-dip galvanised cold-rolled sheet when using electrical energy from wind power

Kernindikator	Einheit	A1 – A3	C1	C2	C3	C4	D
GWP-total	[kg CO_2-Äq.]	4,36E+02	0,00E+00	8,95E+00	2,27E+01	0,00E+00	-2,82E+01
GWP-fossil	[kg CO_2-Äq.]	4,35E+02	0,00E+00	8,93E+00	2,23E+01	0,00E+00	-2,80E+01
GWP-biogenic	[kg CO_2-Äq.]	1,02E+00	0,00E+00	-3,28E-02	3,89E-01	0,00E+00	-1,43E-01
GWP-luluc	[kg CO_2-Äq.]	1,39E-01	0,00E+00	5,33E-02	3,53E-03	0,00E+00	-8,05E-03
ODP	[kg CFC11-Äq.]	1,22E-06	0,00E+00	1,56E-12	6,07E-10	0,00E+00	-6,50E-08
AP	[mol H^+-Äq.]	1,57E+00	0,00E+00	4,54E-02	3,39E-02	0,00E+00	-9,04E-02
EP-freshwater	[kg P-Äq.]	1,17E-02	0,00E+00	2,08E-05	1,33E-04	0,00E+00	-6,53E-04
EP-marine	[kg N-Äq.]	5,32E-01	0,00E+00	2,21E-02	1,11E-02	0,00E+00	-3,06E-02
EP-terrestrial	[mol N-Äq.]	5,78E+00	0,00E+00	2,46E-01	1,15E-01	0,00E+00	-3,32E-01
POCP	[kg NMVOC-Äq.]	1,43E+00	0,00E+00	4,31E-02	2,66E-02	0,00E+00	-8,17E-02
ADPE	[kg Sb-Äq.]	5,28E-02	0,00E+00	6,31E-07	4,05E-06	0,00E+00	-2,80E-03
ADPF	[MJ]	5,85E+03	0,00E+00	1,21E+02	3,13E+02	0,00E+00	-3,80E+02
WDP	[m^3 world equiv., extracted]	5,44E+01	0,00E+00	4,63E-02	6,36E-01	0,00E+00	-2,99E+00

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The declared product does not contain any biogenic carbon.

Information describing the biogenic carbon content at the plant gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	-	kg C

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO2.

The mass fractions for the waste treatment, disposal and reuse scenario are based on data from *Helmus*.

End of Life (C1–C4)

Name	Value	Unit
Collected separately waste type (Scrap)	969	kg
Reuse	53	kg
Recycling	916	kg

Reuse, recovery and recycling potential (D), relevant scenario details

Name	Value	Unit
Collection Rate	96,6	%
Recycling	91,6	%
Reuse	5,3	%
Loss	3,1	%

5. LCA: Results

The following table shows the results of the Life Cycle Assessment for the declared product (1 tonne of hot-dip galvanised cold-rolled sheet):

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = 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	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 t hot-dip galvanised cold-rolled sheet

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Global Warming Potential total (GWP-total)	kg CO_2 eq	8.61E+02	0	8.95E+00	2.27E+01	0	-4.57E+01
Global Warming Potential fossil fuels (GWP-fossil)	kg CO_2 eq	8.58E+02	0	8.93E+00	2.23E+01	0	-4.55E+01
Global Warming Potential biogenic (GWP-biogenic)	kg CO_2 eq	2.75E+00	0	-3.28E-02	3.89E-01	0	-1.46E-01
Global Warming Potential luluc (GWP-luluc)	kg CO_2 eq	1.98E-01	0	5.33E-02	3.53E-03	0	-1.05E-02
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11 eq	1.23E-06	0	1.56E-12	6.07E-10	0	-6.5E-08
Acidification potential of land and water (AP)	mol H^+ eq	2.08E+00	0	4.54E-02	3.39E-02	0	-1.1E-01
Eutrophication potential aquatic freshwater (EP-freshwater)	kg P eq	1.23E-02	0	2.08E-05	1.33E-04	0	-6.54E-04
Eutrophication potential aquatic marine (EP-marine)	kg N eq	7.06E-01	0	2.21E-02	1.11E-02	0	-3.74E-02
Eutrophication potential terrestrial (EP-terrestrial)	mol N eq	7.66E+00	0	2.46E-01	1.15E-01	0	-4.06E-01
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC eq	1.9E+00	0	4.31E-02	2.66E-02	0	-1E-01
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq	5.27E-02	0	6.31E-07	4.05E-06	0	-2.79E-03
Abiotic depletion potential for fossil resources (ADPF)	MJ	1.22E+04	0	1.21E+02	3.13E+02	0	-6.45E+02
Water use (WDP)	m^3 world eq deprived	5.67E+01	0	4.63E-02	6.36E-01	0	-3.01E+00

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 t hot-dip galvanised cold-rolled sheet

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as energy carrier (PERE)	MJ	2.08E+03	0	7.81E+00	2.94E+02	0	-1.1E+02
Renewable primary energy resources as material utilization (PERM)	MJ	0	0	0	0	0	0
Total use of renewable primary energy resources (PERT)	MJ	2.08E+03	0	7.81E+00	2.94E+02	0	-1.1E+02
Non renewable primary energy as energy carrier (PENRE)	MJ	1.22E+04	0	1.21E+02	3.13E+02	0	-6.45E+02
Non renewable primary energy as material utilization (PENRM)	MJ	0	0	0	0	0	0
Total use of non renewable primary energy resources (PENRT)	MJ	1.22E+04	0	1.21E+02	3.13E+02	0	-6.45E+02
Use of secondary material (SM)	kg	1.08E+03	0	0	0	0	-5.72E+01
Use of renewable secondary fuels (RSF)	MJ	0	0	0	0	0	0
Use of non renewable secondary fuels (NRSF)	MJ	0	0	0	0	0	0
Use of net fresh water (FW)	m^3	3.22E+00	0	7.11E-03	1.03E-01	0	-1.71E-01

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 t hot-dip galvanised cold-rolled sheet

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed (HWD)	kg	9.13E-01	0	3.24E-10	-6.11E-08	0	-4.84E-02
Non hazardous waste disposed (NHWD)	kg	6.61E+01	0	1.76E-02	2.87E-01	0	-3.5E+00
Radioactive waste disposed (RWD)	kg	7.16E-01	0	1.26E-04	3.05E-02	0	-3.8E-02
Components for re-use (CRU)	kg	0	0	0	5.3E+01	0	0
Materials for recycling (MFR)	kg	1.74E+00	0	0	9.16E+02	0	-9.23E-02
Materials for energy recovery (MER)	kg	0	0	0	0	0	0
Exported electrical energy (EEE)	MJ	0	0	0	0	0	-4.19E+01
Exported thermal energy (EET)	MJ	5.57E+00	0	0	0	0	2.95E-01

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 t hot-dip galvanised cold-rolled sheet

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Incidence of disease due to PM emissions (PM)	Disease incidence	ND	ND	ND	ND	ND	ND
Human exposure efficiency relative to U235 (IR)	kBq U235 eq	ND	ND	ND	ND	ND	ND

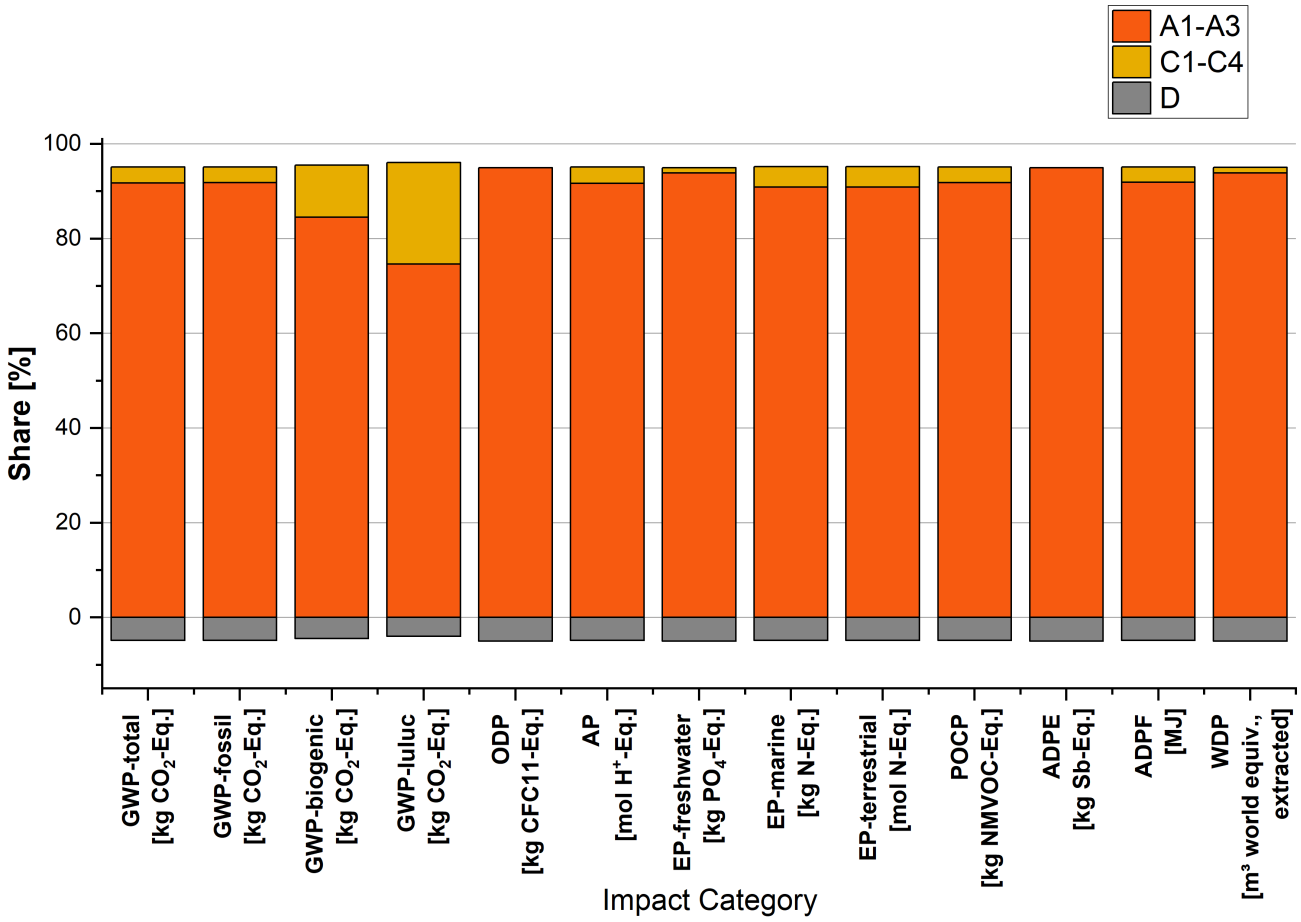
Comparative toxic unit for ecosystems (ETP-fw)	CTUe	ND	ND	ND	ND	ND	ND
Comparative toxic unit for humans (carcinogenic) (HTP-c)	CTUh	ND	ND	ND	ND	ND	ND
Comparative toxic unit for humans (noncarcinogenic) (HTP-nc)	CTUh	ND	ND	ND	ND	ND	ND
Soil quality index (SQP)	SQP	ND	ND	ND	ND	ND	ND

The additional and optional impact categories according to EN 15804+A2 are not declared.

Disclaimer 1 – applies to the indicator 'Potential impact of human exposure to U235'. This impact category mainly addresses the potential impact of low-dose ionising radiation on human health in the nuclear fuel cycle. This does not consider impacts due to possible nuclear accidents and occupational exposure, nor to the disposal of radioactive waste in underground facilities. Potential ionising radiation from soil, radon and some building materials is also not measured by this indicator.

Disclaimer 2 – applies to the indicators 'Abiotic depletion potential – non-fossil resources'; 'Abiotic depletion potential – fossil fuels'; 'Water depletion potential (users)', 'Potential toxicity comparison unit for ecosystems', 'Potential toxicity comparison unit for humans – carcinogenic effect', 'Potential toxicity comparison unit for humans – non-carcinogenic effect', 'Potential soil quality index'. The results of this environmental impact indicator must be used with caution, as the uncertainties in these results are high or there is only limited experience with the indicator.

6. LCA: Interpretation



The results in section 5 show that almost the entire greenhouse gas emissions (GWP total) of modules A1–A3 come from fossil sources (cf. indicator GWP fossil).
As expected, the more detailed data analysis shows that the largest direct greenhouse gas emitters in module A3 are the electric arc furnace process for slab production and the further processing plants for the production of the hot-dip galvanised cold-rolled sheets. However, the predominant share in module A3 comes from electrical energy, which is used to melt down the steel scrap.

In contrast, the absolute shares of the greenhouse gas potentials from biogenic sources (GWP biogenic) and from land use and land use change (GWP luluc) only account for around two to three orders of magnitude less of the total global warming potential. As expected, the contributions in all modules are exclusively attributable to the upstream processes, and here primarily from the electrical energy used.
The potential for depletion of the stratospheric ozone layer (ODP) is caused almost exclusively by process emissions during the production of input materials in module A1.

For the remaining impact indicators, raw material production (module A1) and steel production (module A3) account for the largest shares in the absolute values of the environmental indicators. As expected, the largest contributions are made by electricity production and the production of input materials. In addition, the impact indicators describing the acidification potential (AP), the eutrophication potential (EP fresh water, EP marine, EP terrestrial) and the ozone creation potential (POCP)

are influenced by the direct NOx and SO2 process emissions.

The credits from the reuse and recycling of steel scrap in module D result from the chosen approach to recycling the steel products.

To summarise, almost all impact indicators are determined by the steel production process and the manufacture of the preliminary products. Material efficiency therefore represents the greatest lever for reducing almost all impact indicators.

7. Requisite evidence

Not of relevance for this EPD

8. References

Standards

EN 10143
DIN EN 10143:2006-09, Continuously hot-dip coated steel sheet and strip – Tolerances on dimensions and shape

EN 10346
DIN EN 10346:2015-10, Continuously hot-dip coated sheet steel and strip – Technical delivery conditions

EN 13501
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