ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	Stahlwerk Thüringen
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	
Issue date	
Valid to	

Railway Steel Sleeper Profiles

Stahlwerk Thüringen GmbH

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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

1. General Information

Stahlwerk Thüringen GmbH

Programme holder

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

Declaration number

This declaration is based on the product category rules:

Structural steels, 01/08/2021
(PCR checked and approved by the SVR)

Issue date

Valid to

Name of Chairman
(Chairman of Institut Bauen und Umwelt e.V.)

Name of Managing Director
(Managing Director Institut Bauen und Umwelt e.V.)

Railway Steel Sleeper Profiles

Owner of the declaration

Stahlwerk Thüringen
Kronacher Straße 6
07333 Unterwellenborn
Germany

Declared product / declared unit

The declared unit is 1 ton of average steel sleepers.

Scope:

This environmental product declaration covers steel products rolled out to steel sleepers, intended for bolted, welded or otherwise connected constructions of rail constructions.

This EPD is valid for the product SWT Stahlwerk Thueringen Green Steel®, for hot-rolled steel sleepers, produced with renewably generated and not EEG-subsidized electricity proven by Stahlwerk Thüringen GmbH through guarantees of origin.
The production shares in this EPD are 100 % secondary route (Electric Arc Furnace steel production) based on 100 % scrap input with 100 % green energy purchased with GoO.
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

Name of verifier,
(Independent verifier)

2. Product

2.1 Product description/Product definition

This EPD applies to 1 ton of steel sleepers. It covers steel products of grades S235 rolled out to steel sleepers.
For the application and use the respective national provisions apply.

2.2 Application

Railway construction, track structure

2.3 Technical Data

This EPD is valid for steel sleepers of different dimensions. Specific information on dimension tolerances, constructional data as well as mechanical and chemical properties can be found in the relevant literature and/or the standards.

Constructional data

Name	Value	Unit
Density	7850	kg/m^3
Modulus of elasticity	210000	N/mm^2
Coefficient of thermal expansion	12	$10^{-6}K^{-1}$
Thermal conductivity	48	W/(mK)
Melting point depending on the alloy proportions up to	1536	°C
Share Modulus	81000	N/mm^2

2.4 Delivery status

The dimensions of the declared products may vary according to the intended application.

2.5 Base materials/Ancillary materials

Steel sleepers are non-or low-alloy steel products whose carbon content is between 0 and 0.6 %. Iron is the main component of steel sleepers. The content of other elements is significantly less. The exact chemical composition varies depending on the steel grade.

Auxiliary materials and alloys:

The rates of these additives depend on the steel grade and are on average: 0,7 % silicomanganese, 0,3 % ferromanganese, 0,1% ferrosilicon and < 0,1 % other alloys. The considered products do not contain substances listed in the '*Candidate List of Substances of Very High Concern for Authorisation*' (SVHC) (19.01.2021) exceeding 0.1 % by mass.

The product for authorization contains substances on the ECHA list of substances of very high concern (SVHC) (14 July2021) above 0.1 % by mass: **No**.

The product contains further carcinogenic, mutagenic, reprotoxic (CMR) substances of category 1A or 1B that not in the candidate list, above 0.1 mass % in at least one subproduct: **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

In the electric steel production route, scrap is molten in an electric arc furnace to obtain liquid steel.

Refining (lowering of sulfur, phosphorous and other tramp elements) and alloying (e.g. about 1 % Mn, 0.2% Si) is applied to give the requested characteristics to the steel.
At the end of the steelmaking process, the liquid steel is transformed into a semi-finished product in a continuous casting machine.
The semi-product (beam-blank) is hot-rolled into the final product dimensions.

Quality control: *ISO 9001* Monitoring according to the product standards, e.g. *EN 10025*.

2.7 Environment and health during manufacturing

No measures relating to safety, health and environmental protection during the manufacturing process extending beyond national guidelines are required.

2.8 Product processing/Installation

Processing recommendations:

Planning, processing, implementation and intended use of steel constructions have to be carried out depending on the respective applications according to the generally recognized rules of engineering and manufacturer's recommendations.

In addition, the European Standards will work in connection with national amendments, national instructions, guidelines and publications, as well as legal provisions.

Regarding transport and storage of steel sleepers, the generally accepted requirements for securing loads have to be observed.

Instruction details of the manufacturer based on verified standards and guidelines regarding welding, galvanizing as well as hot and cold forming are to be observed in every case.

Occupational safety/Environmental protection:

When processing/using steel sleepers according to the generally recognized rules of engineering there are no measures to be taken which are going beyond public occupational health and safety.

Residual material:

During processing, residual pieces as well as turnings are to be collected separately.
This scrap steel can be entirely recycled by melting and producing new steel products.

2.9 Packaging

Steel sleepers are delivered bundled with steel straps.
Packaging is not considered within the LCA.

2.10 Condition of use

Steel sleepers are non-/low-alloyed steel products generated by alloying iron with other metals and non-metals (esp. carbon). Iron is the main component of steel sleepers. The components are listed under chapter 2.5 'Base materials'. During usage, no changes in material composition shall occur.

2.11 Environment and health during use

The intended use of steel sleepers does not endanger health or the environment in any known way.

2.12 Reference service life

The reference service life is not relevant for consideration of the LCA. As construction products with many different applications,

a reference service life for steel sleepers is not declared here.

The purpose, possible corrosion protection and adequate maintenance are decisive for service life.

2.13 Extraordinary effects

Fire

The material is class A1, i.e. not flammable per *EN 13501*.
The material does not emit fumes or fire gases.

Fire safety

Name	Value
Building material class acc. EN 13501-1	A1

Water

Steel is stable in water, insoluble and does not emit substances in water. In case of flooding, no impacts are to be expected. Steel can corrode in the presence of oxygen in the water (= slow oxidation).

Mechanical destruction

Due to the ductility of steel, steel structures react resiliently in the event of unforeseeable mechanical destruction: In the case of tensile load, necking will occur before cracking. In case of a lasting high compression load, components of steel may buckle or bulge. No splintering or breaking edges should result.

2.14 Re-use phase

General:

Steel sleepers are recyclable by 100 %. Due to the magnetic properties of steel, 97 % of the used steel is regained after dismantling European Commission Technical Steel Research.

Re-use:

Steel sleepers can be re-used. It is expected that around 14 % of the products are re-used after dismantling.

Recycling:

Steel sleepers can be recycled without any problems after dismantling. It is expected that around 83 % of the products are used for closed-loop recycling.

Data from industry estimates based on the following sources:
European Commission Technical Steel Research

2.15 Disposal

Due to its high value as a resource, steel scrap is not disposed of but instead fed into a well-stablished cycle of reuse or recycling. However, in the case of dumping due to collection loss, no environmental impacts are expected.

Waste code according to European Waste Catalogue *EWC*: 17 04 05 - iron and steel

2.16 Further information

Additional information on constructing with steel can be obtained from bauforumstahl.de.

3. LCA: Calculation rules

3.1 Declared Unit

The reference unit is 1 ton of steel sleepers. Foreground data for production are integrated into the software model for the considered production site/company. LCI is assessed as per the annual production data (100 %) of Stahlwerk Thüringen GmbH at the site Unterwellenborn.

The EPD covers steel products of the grades S235 rolled out to steel sleepers in sizes TN 22, TN 25, SW 82/54, HYS 95x140 and UIC 28. The annual production data is representative for all steel products covered by the declared unit. In addition, for the modelling and calculation of the EPD results a conservative approach was followed.

Declared unit

Name	Value	Unit
Declared unit	1	t

Input and production quantities for the entire calendar year 2018 were taken into account. The calculated results can thus be considered representative for the entire product portfolio of steel sleepers of Stahlwerk Thüringen.

3.2 System boundary

Type of the EPD: cradle-to-gate - with options: Module A1-A3, Modules C1-C4 and Module D were considered.

Modules A1-A3 covers the production stage including the upstream burdens of purchased raw materials (ferroalloys, lime, dolomite, etc.), their transports and the manufacturing at the production site in Unterwellenborn. Material and energy flows for the electric arc furnace and the hot strip mill are considered. All electricity consumed to produce the steel sleepers is produced from 100 % hydropower in Europe, with 0,0062 kg CO_2e/kWh, purchased with GoO.
The study did not consider the packaging of the product (SWT deliveries are without packaging materials).

Modules C1-C4 consider the dismantling of the considered product (C1), the transportation of the dismantled components to their final End-of-Life (EoL) destination (C2), the waste processing for reuse, recovery or recycling (C3) as well as the disposal (C4). 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 C1).

Module D refers to the End-of-Life, including recycling and/or reuse.

3.3 Estimates and assumptions

Due to the lack of available datasets for some alloying elements (e.g. ferrovanadium), South-African data sets were used instead of local data. However, amounts of these elements are very low – except for silicomanganese – and the use of South-African data sets would be the 'worst-case' assumption for European production, so the set-up scenario is considered a conservative approach. The proxy for silicomanganese was considered 75 % ferromanganese and 25 % ferrosilicon.

3.4 Cut-off criteria

All information from the data collection process has been considered; covering all used materials, thermal energy, and electrical energy. etc. Measurement of emissions took place and was considered.
No processes, materials or emissions that are known to contribute significantly to the environmental impact of the products under study have been omitted. All input or outputs contributing more than 1 % to the overall mass or energy of the system were considered.
It can be assumed, that the sum of all excluded inputs and outputs contribute less than 5 % to the impact assessment categories.
The manufacturing of required machinery and other Infrastructure is not considered in the LCA.

3.5 Background data

For the life cycle modelling of the product under study, the *LCA FE (GaBi) Software* System for Life Cycle Engineering, content version 2022.2, is used (*LCA FE Software)*. The *LCA FE (GaBi) database* contains consistent and documented datasets which can be viewed in the online documentation (*LCA FE Documentation)*.

3.6 Data quality

The foreground data collected by the manufacturer are based on yearly production amounts and extrapolations of measurements on specific machines and plants. The production data refers to the year 2018.
All relevant background datasets are taken from the *LCA FE (GaBi) Software* database and are representative of the years 2017-2021.

The study is based on high-quality data.

3.7 Period under review

The foreground data collected by Stahlwerk Thüringen are based on annual production amounts referring to the year 2018.

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: Europe

3.9 Allocation

Steel production via the electric arc furnace (EAF) generates EAF slag and scales as co-products. The EAF process that produces these co-products cannot be further sub-divided into sub- processes related to each co-product, so allocation is required.
The allocation method used here for EAF slag was developed by the *World Steel Association and EUROFER* to be in line with *EN 15804*. The methodology is based on physical allocation taking into account how changes in inputs and outputs affect the production of co-products.

Scales generated during steelmaking are sold for interieur application in the automotive industry. To address the use of scales within other industry applications economic allocation is applied.

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 LCA FE (GaBi) background database (content version 2022.2) was used to calculate the LCA.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The declared product does not include biogenic carbon. There is no packaging considered within the given study.
Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO_2.

This EPD covers one End of Life scenario: 100 % Recycling

Metals are assumed to reach the end of waste status directly at construction site. The treatment as well as net benefits and loads of reuse or recycling potentials (for the net scrap amount only) are grouped to module D.

End of life (C1 - C4)

Name	Value	Unit
Landfilling - Scenario	0	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Steel scrap being recycled at End-of-Life is modelled via the "value of scrap" approach in accordance with the *worldsteel* methodology.

Name	Value	Unit
Recycling - Scenario	1000	kg

5. LCA: Results

The following table contains the LCA results for a declared unit of 1 ton steel sleepers.

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 ton Structural Steel: Railway Sleepers

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Global Warming Potential total (GWP-total)	kg CO_2 eq	3.05E+02	2.19E+00	2.51E+00	0	0	1.22E+02
Global Warming Potential fossil fuels (GWP-fossil)	kg CO_2 eq	3.04E+02	2.86E+00	2.49E+00	0	0	1.22E+02
Global Warming Potential biogenic (GWP-biogenic)	kg CO_2 eq	3.56E-01	-7.61E-01	-3.44E-03	0	0	-6.23E-02
Global Warming Potential luluc (GWP-luluc)	kg CO_2 eq	3.88E-02	9.32E-02	1.39E-02	0	0	2.52E-03
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11 eq	2.08E-10	5.72E-12	1.49E-13	0	0	2.67E-13
Acidification potential of land and water (AP)	mol H^+ eq	8.65E-01	1.1E-02	2.25E-03	0	0	2.62E-01
Eutrophication potential aquatic freshwater (EP-freshwater)	kg P eq	1.19E-04	5.1E-05	7.43E-06	0	0	2.21E-05
Eutrophication potential aquatic marine (EP-marine)	kg N eq	1.67E-01	2.17E-03	6.75E-04	0	0	4.61E-02
Eutrophication potential terrestrial (EP-terrestrial)	mol N eq	1.82E+00	2.83E-02	8.17E-03	0	0	4.05E-01
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC eq	5.52E-01	8.5E-03	1.94E-03	0	0	1.87E-01
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq	6.54E-05	1.52E-06	2.08E-07	0	0	3.04E-04
Abiotic depletion potential for fossil resources (ADPF)	MJ	3.27E+03	2.4E+02	3.32E+01	0	0	1.12E+03
Water use (WDP)	m^3 world eq deprived	3.55E+01	2.3E-01	2.23E-02	0	0	2.27E+01

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 ton Structural Steel: Railway Sleepers

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as energy carrier (PERE)	MJ	2.4E+03	1.6E+01	1.89E+00	0	0	-7.06E+01
Renewable primary energy resources as material utilization (PERM)	MJ	0	0	0	0	0	0
Total use of renewable primary energy resources (PERT)	MJ	2.4E+03	1.6E+01	1.89E+00	0	0	-7.06E+01
Non renewable primary energy as energy carrier (PENRE)	MJ	3.27E+03	2.41E+02	3.33E+01	0	0	1.12E+03
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	3.27E+03	2.41E+02	3.33E+01	0	0	1.12E+03
Use of secondary material (SM)	kg	1.07E+03	0	0	0	0	-7.05E+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	2.07E+00	1.76E-02	2.14E-03	0	0	5.12E-01

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 ton Structural Steel: Railway Sleepers

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed (HWD)	kg	5.21E-07	1.62E-09	1.6E-10	0	0	8.66E-09
Non hazardous waste disposed (NHWD)	kg	1.69E+00	3.75E-02	4.78E-03	0	0	-1.7E+01
Radioactive waste disposed (RWD)	kg	2.19E-02	1.21E-03	4.1E-05	0	0	-1.39E-04
Components for re-use (CRU)	kg	0	0	0	0	0	0
Materials for recycling (MFR)	kg	0	0	0	1E+03	0	0
Materials for energy recovery (MER)	kg	0	0	0	0	0	0
Exported electrical energy (EEE)	MJ	0	0	0	0	0	0
Exported thermal energy (EET)	MJ	0	0	0	0	0	0

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 ton Structural Steel: Railway Sleepers

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

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 or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, 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', 'potential comparative toxic unit for ecosystems', '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 as there is limited experience with the indicator.

All electricity consumed for the production of the steel sleepers is produced from 100% hydropower in Europe.

6. LCA: Interpretation

The following table gives a detailed evaluation of all LCIA results of the production phase (Module A1-A3):

	On-Site (EAF, Hot Rolling)	Alloys (e.g. ferro-manganese)	Energy (electricity, natural gas, ...)	Auxiliaries (e.g. lime, dolomite, ...)
1. Environmental impact indicators				
01 EN15804+A2 Climate Change - total [kg CO2 eq.]	>40%	>35%	~5%	~15%
02 EN15804+A2 Climate Change, fossil [kg CO2 eq.]	>40%	>35%	~5%	~15%
03 EN15804+A2 Climate Change, biogenic [kg CO2 eq.]		>-5%	>75%	<30%
04 EN15804+A2 Climate Change, land use and land use change [kg CO2 eq.]		>65%	~15%	<20%
05 EN15804+A2 Ozone depletion [kg CFC-11 eq.]		~70%	<5%	~25%
06 EN15804+A2 Acidification [Mole of H+ eq.]	~25%	~70%	<5%	<5%
07 EN15804+A2 Eutrophication, freshwater [kg P eq.]		>15%	<10%	<75%
08 EN15804+A2 Eutrophication, marine [kg N eq.]	~35%	~55%	~5%	~5%
09 EN15804+A2 Eutrophication, terrestrial [Mole of N eq.]	~35%	~55%	~5%	~5%
10 EN15804+A2 Photochemical ozone formation, human health [kg NMVOC eq.]	<40%	~50%	~5%	>5%
11 EN15804+A2 Resource use, mineral and metals [kg Sb eq.]		~80%	<20%	<<5%
12 EN15804+A2 Resource use, fossils [MJ]		~35%	>50%	<15%
13 EN15804+A2 Water use [m³ world equiv.]	>125%	<55%	<45%	>-120%
2. Ressource use indicators				
01 EN15804+A2 Use of renewable primary energy (PERE) [MJ]		~5%	<95%	<<5%
03 EN15804+A2 Total use of renewable primary energy resources (PERT) [MJ]		~5%	<95%	<<5%
04 EN15804+A2 Use of non-renewable primary energy (PENRE) [MJ]		~35%	>50%	<15%
06 EN15804+A2 Total use of non-renewable primary energy resources (PENRT) [MJ]		~35%	>50%	<15%
10 EN15804+A2 Use of net fresh water (FW) [m3]	~55%	>25%	<20%	<<5%
3. Output flows and waste categories				
01 EN15804+A2 Hazardous waste disposed (HWD) [kg]		<10%	>75%	~15%
02 EN15804+A2 Non-hazardous waste disposed (NHWD) [kg]		~25%	~45%	~30%
03 EN15804+A2 Radioactive waste disposed (RWD) [kg]		>80%	<5%	~15%
5. Optional indicators				
01 EN15804+A2 Particulate matter [Disease incidences]	>35%	<55%	<<5%	<10%
02 EN15804+A2 Ionising radiation, human health [kBq U235 eq.]		>75%	~5%	<20%
03 EN15804+A2 Ecotoxicity, freshwater [CTUe]	<5%	~60%	~5%	>30%
04 EN15804+A2 Human toxicity, cancer [CTUh]	~15%	~15%	~65%	~5%
05 EN15804+A2 Human toxicity, non-cancer [CTUh]	~65%	<10%	<15%	>10%
06 EN15804+A2 Land Use [Pt]		<95%	<<5%	~5%

Climate Change, Acidification Potential, Eutrophication Potential (marine, terrestrial) and Photochemical Ozone Creation Potential are mostly caused by onsite emissions as well as the extraction and processing of raw materials.
Eutrophication Potential (freshwater) is driven by the use of water.
Ozone Depletion Potential is mostly caused by emissions from the pre-chains of alloying materials.
Resource Use (mineral and metals) relates to the use of non-renewable elements in the production of alloying materials e.g., ferro-manganese. Resource Use (fossils) is dominated by the extraction and processing of raw materials (alloys, auxiliaries) and the generation of natural gas.
The total use of renewable primary energy carrier (PERT) is dominated by the generation of electricity from hydropower. The total use of non-renewable primary energy (PENRT) is dominated by the extraction and processing of raw materials and the generation of natural gas.
Radioactive waste comes from the extraction and processing of raw materials. Non-hazardous wastes include overburden and tailings. Hazardous waste for deposition is mainly produced during the generation of natural gas.

7. Requisite evidence

This EPD covers hot-rolled steel sleepers. Further processing and fabrication depend on the intended application. Therefore, further documentation is not applicable.

7.1 Weathering performance

The rusting rate of unalloyed steel depends on the position of the component and the conditions of the surrounding atmosphere (corrosivity categories according to *ISO 12944-2*. If required, the surfaces of fabricated structural components are usually protected with anticorrosion material in order to prevent any direct contact with the atmosphere. The weathering of this protection depends on the applied protection system.

8. References

Candidate List of Substances of Very High Concern for Authorisation
Candidate List of substances of very high concern for Authorisation, 2021, ECHA, echa.europa.eu

EN 10025-2
Hot rolled products of structural steels
Technical delivery conditions for non-alloy structural steels

EN 13501
Fire classification of construction products and building elements

EN 15804
EN 15804+A1:2013, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

EWC
European Waste Catalogue, European Commission

ISO 9001
Quality management systems – Requirements

ISO 12944-2
Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 2: Classification of environments

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

IBU 2021
IBU 2021, General Instructions for the EPD programme of Institut Bauen und Umwelt e.V. Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021www.ibu-epd.de

CPR
Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC Text with EEA relevance

LCA FE (GaBi)
LCA for Experts Software System and Database for Life Cycle Engineering, Sphera Solution GmbH, Leinfelden-Echterdingen, 2022 (https://www.gabi-software.com/support/gabi)

PCR, Part A
Product Category Rules for Building-Related Products and Services, Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report. Institut Bauen und Umwelt e.V. (IBU) November 2021 www.bau-umwelt.de

PCR, Part B
PCR – Part B: Requirements of the EPD for Structural Steel, Institut Bauen und Umwelt e.V., www.bau-umwelt.com, 2023

worldsteel
https://worldsteel.org/wp-content/uploads/Life-cycle-inventory-methodology-report.pdf

World Steel Association and EUROFER
Methodology to determine the LCI of steel industry co-products, 2011

Publisher

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

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Programme holder

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

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Author of the Life Cycle Assessment

Sphera Solutions GmbH
Hauptstraße 111- 113
70771 Leinfelden-Echterdingen
Germany

+49 711 341817-0
info@sphera.com
www.sphera.com

Owner of the Declaration

Stahlwerk Thüringen
Kronacher Straße 6
07333 Unterwellenborn
Germany

+49 3671 4550 0
info@stahlwerk-thueringen.de
www.stahlwerk-thueringen.de

CSN
Companhia Siderúrgica Nacional

SWT STAHLWERK THÜRINGEN

Declaration

Hereby we confirm that the presented EPD draft was calculated using the same rules as the validated EPD for structural steel sections (EPD-STH-20230471-IAB1-EN) from 11th March 2024.
The used data were supervised and proofed by internal verified integrated management system according to ISO 9001, ISO 50001 and ISO 14001.

Unterwellenborn, 28th May 2026

René Merbach
Senior Manager
Quality Assurance
Stahlwerk Thüringen GmbH

Stahlwerk Thüringen GmbH
Kronacher Straße 6
07333 Unterwellenborn
Deutschland

Tel +49 3671 4550 0
Fax +49 3671 4550 7107
Mail info@stahlwerk-thueringen.de
Web www.stahlwerk-thueringen.de

Geschäftsführer:
Carla Lorenz Cardoso
Luis Fernando Martinez Ferreira
Aufsichtsratsvorsitzender:
Volker Schulze

HR B 202 875
Amtsgericht Jena
Registergericht
Ust.-Id.-Nr. DE 150 536 120
St.-Nr. 161/120/04231
EORI-Nr. 2950006

Kreissparkasse Saalfeld-Rudolstadt
IBAN: DE35 8305 0303 0000 0116 73
BIC HELADEF1SAR
Commerzbank AG
IBAN: DE44 8208 0000 0620 0102 00
BIC DRESDEFF827