ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration thyssenKrupp Steel Europe AG

Publisher Institut Bauen und Umwelt e.V. (IBU

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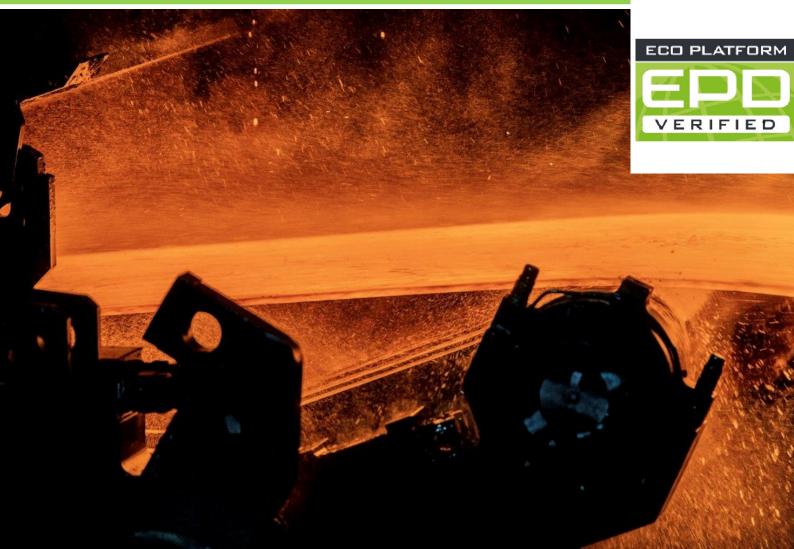
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Hot Rolled Steel Coil thyssenkrupp Steel Europe AG



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General Information Hot Rolled Steel Coil thyssenkrupp Steel Europe AG Programme holder Owner of the declaration IBU - Institut Bauen und Umwelt e.V. thyssenKrupp Steel Europe AG Hegelplatz 1 Kaiser-Wilhelm-Straße 100 10117 Berlin 47166 Duisburg Germany Germany **Declaration number** Declared product / declared unit EPD-TKS-20240545-CBC1-EN The declared unit is 1 metric ton of hot rolled steel coil This declaration is based on the product category rules: This environmental product declaration refers to hot rolled steel coil Structural steels, 01.08.2021 (PCR checked and approved by the SVR) produced at the facilities of thyssenkrupp Steel Europe AG in Duisburg and The owner of the declaration shall be liable for the underlying information Issue date and evidence; the IBU shall not be liable with respect to manufacturer 29.01.2025 information, life cycle assessment data and evidences. The EPD was created according to the specifications of EN 15804+A2. In Valid to the following, the standard will be simplified as EN 15804. 28.01.2030 Verification The standard EN 15804 serves as the core PCR Independent verification of the declaration and data according to ISO 14025:2011 X internally externally Dipl.-Ing. Hans Peters (Chairman of Institut Bauen und Umwelt e.V.)

Florian Pronold

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

Dr.-Ing. Nikolay Minkov, (Independent verifier)



Product

Product description/Product definition

This Environmental Product Declaration refers to hot rolled steel coil, slit coil and cut-to-length sheet produced by thyssenkrupp Steel Europe AG. This includes low and medium alloy steels and high strength steels for example perdur®, perform®, DP-W, weathering steel and manganese-boron steel.

No Declaration of Performance in accordance with the CPR or similar legal provisions is required to place the product n the market, as it is a semi-finished product and therefore not a product that is ready for immediate use within the meaning of corresponding regulations.

Application

Hot rolled products can be found in varoius industrial sectors, such as:

- · Automotive industry and their supplier
- · Commercial vehicle industry
- Construction
- House industry
- · Machinery industry
- · Pressure vessel production
- · Profile industry
- · Special vehicle construction
- · Steel structures and plant building
- Truck industry
- · Tube industry / Pipe Line industry

and further industrial applications.

Technical Data

The hot rolled steel coils are produced in different hot rolling mills at thyssenkrupp Steel Europe AG. The performance of the product depends on essential characteristics and relevant standards.

Constructional data

Name	Value	Unit
Maximum thickness of the sheet	25.5	mm
Maximum widthness	2030	mm
Maximum coil weight	36	t

Base materials/Ancillary materials

The material is produced from a steel slab. The base material composition consists of iron, scrap and <5% alloying elements in total. Alloying elements are for example chromium, manganese and silicon.

- 1) This product contains substances listed in the candidate list (date: 20.04.2024) exceeding 0.1 percentage by mass: **no**
- 2) 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**
- 3) 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**

Reference service life

Hot rolled steel products can be used in various applications. Therefore, the lifetime of the products differs significantly and a reference service life cannot declared.

LCA: Calculation rules

Declared Unit

The declared unit is 1 ton of hot rolled steel coil.

Foreground data for the production are integrated into the LCA
FE (GaBi) Software model for the production sites under study.

Background data are taken from the LCA FE (GaBi) Database.

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	t
Density	7850	kg/m ³
Conversion factor to 1 kg	1000	

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

For the calculation of the declared unit, all grades produced were included in the form of one production year. All input and output quantities for the production period under study (2021) were taken into account.

The analysis of different grade specifications identifies a variation of the product-related carbon footprint and the resource use (fossils) of a maximum of 5%. For eutrophication marine, eutrophication terrestrial and photochemical ozone formation, this interval amounts to a maximum of 7%, for acidification to a maximum of 13%. No relevant variation is given for eutrophication fresh water.

For complex-phase steel the variation in results is expected to

be higher. The production volume for these types of steel products is << 5% of the total production.

System boundary

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

Modules A1-A3 cover the production stage including the upstream burdens of purchased raw materials and energies, their transports and the process steps at the production sites under study. All electricity consumed is produced on-site. The GWP factor is not provided as the electricity is mainly produced based on process gases occurring in the coke oven, the blast furnace as well as the basic oxygen furnace on-site. The natural gas consumed is modelled with 0,0132 kg CO2e/MJ.

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

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

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

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 2024.1) was used to calculate the LCA.

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. The EPD covers four End of Life scenarios (SteelConstructioninfo; Sansom, M. / Meijer, J.):

Scenario 0: 100 % RecyclingScenario 1: 100 % Reuse

• Scenario 2: 100 % Loss / Landfill

• Scenario 3: 88 % Recycling, 11 % Reuse and 1 % Loss

In case a **reference service life** according to applicable ISO standards is declared then the assumptions and in-use conditions underlying the determined RSL shall be declared. In addition, it shall be stated that the RSL applies to the reference conditions only.

The same holds for a service life declared by the manufacturer. Corresponding information related to in-use conditions needs not be provided if a service life taken from the list of service life by *BNB* is declared.

End of life (C1 - C4)

Name	Value	Unit
Landfilling - Scenario 0	0	kg
Landfilling - Scenario 1	0	kg
Landfilling - Scenario 2	1000	kg
Landfilling - Scenario 3	10	kg

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

Name	Value	Unit
Recycling - Scenario 0	1000	kg
Recycling - Scenario 1	0	kg
Recycling - Scenario 2	0	kg
Recycling - Scenario 3	880	kg
Reuse - Scenario 0	0	kg
Reuse - Scenario 1	1000	kg
Reuse - Scenario 2	0	kg
Reuse - Scenario 3	110	kg



LCA: Results

The following table contains the LCA results for a declared unit of 1 ton structural steel - hot rolled steel coil.

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

Pro	duct sta	age	_	ruction s stage			L	Jse stag	е	E	End of li	9	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
A 1	A2	А3	A4	A5	5 B1 B2 B3 B4 B5 B6 B7 C1 C2 C3 C4								D			
Χ	Χ	Х	MND	MND	MND MND MNR MNR MNR MND MND X					Χ	Χ	Х	Х	X		

RESULTS (OF THE I	LCA - El	NVIRON	MENTA	L IMP	ACT ac	cording	g to EN	15804	1+A2: 1	ton hot	rolled	steel co	il		
Parameter	Unit	A1-A3	C1	C2	C3	C3/1	C3/2	C3/3	C4	C4/1	C4/2	C4/3	D	D/1	D/2	D/3
GWP-total	kg CO ₂ eq	2.08E+03	2.1E+01	3.18E+00	0	0	0	0	0	0	1.5E+01	1.5E-01	-1.49E +03	-2.08E +03	2.36E+02	-1.54E +03
GWP-fossil	kg CO ₂ eq	2.08E+03	2.1E+01	3.21E+00	0	0	0	0	0	0	1.5E+01	1.5E-01	-1.5E+03	-2.08E +03	2.37E+02	-1.55E +03
GWP- biogenic	kg CO ₂ eq	1.63E-01	-8.58E- 02	-8.04E- 02	0	0	0	0	0	0	-1.03E- 01	-1.03E- 03	8.84E+00	-1.74E- 01	-1.4E+00	7.75E+00
GWP-luluc	kg CO ₂ eq	1.12E+00	1.16E-02	5.26E-02	0	0	0	0	0	0	8.98E-02	8.98E-04	-2E-01	-1.11E +00	3.16E-02	-2.97E- 01
ODP	kg CFC11 eq	-2.99E- 10	8.98E-12	4.61E-13	0	0	0	0	0	0	4.04E-11	4.04E-13	2.01E-09	2.99E-10	-3.19E- 10	1.8E-09
AP	mol H ⁺ eq	3.73E+00	1.94E-01	4.16E-03	0	0	0	0	0	0	1.06E-01	1.06E-03	-3.67E +00	-3.73E +00	5.8E-01	-3.63E +00
EP- freshwater	kg P eq	1.57E-03	1.06E-04	1.34E-05	0	0	0	0	0	0	3.4E-05	3.4E-07	-3.49E- 04	-1.57E- 03	5.53E-05	-4.79E- 04
EP-marine	kg N eq	1.08E+00	9.93E-02	1.5E-03	0	0	0	0	0	0	2.74E-02	2.74E-04	-5.89E- 01	-1.08E +00	9.32E-02	-6.36E- 01
EP-terrestrial	mol N eq	1.17E+01	1.09E+00	1.78E-02	0	0	0	0	0	0	3.01E-01	3.01E-03	-5.28E +00	-1.17E +01	8.36E-01	-5.93E +00
POCP	kg NMVOC eq	3.43E+00	2.7E-01	4.16E-03	0	0	0	0	0	0	8.37E-02	8.37E-04	-2.39E +00	-3.43E +00	3.79E-01	-2.48E +00
ADPE	kg Sb eq	7.11E-04	2.79E-06	2.73E-07	0	0	0	0	0	0	9.7E-07	9.7E-09	-8.49E- 03	-7.11E- 04	1.34E-03	-7.54E- 03
ADPF	MJ	1.76E+04	2.9E+02	4.12E+01	0	0	0	0	0	0	1.97E+02	1.97E+00	-1.49E +04	-1.76E +04	2.36E+03	-1.5E+04
WDP	m ³ world eq deprived	2.48E+02	1.31E+00	4.85E-02	0	0	0	0	0	0	1.71E+00	1.71E-02	-1.01E +02	-2.48E +02	1.6E+01	-1.16E +02

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential)

RESULTS (OF THE	LCA -	INDICAT	ORS TO	D DES	CRIBE I	RESOU	RCE US	E acc	ording t	o EN 15	804+A2	: 1 ton I	not rolle	d steel	coil
Parameter	Unit	A1-A3	C1	C2	C3	C3/1	C3/2	C3/3	C4	C4/1	C4/2	C4/3	D	D/1	D/2	D/3
PERE	MJ	3.73E +02	1.61E +01	3.55E +00	0	0	0	0	0	3.44E +01	3.44E-01	5.89E +02	-3.72E +02	-9.31E +01	4.76E +02	0
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	3.73E +02	1.61E +01	3.55E +00	0	0	0	0	0	3.44E +01	3.44E-01	5.89E +02	-3.72E +02	-9.31E +01	4.76E +02	0
PENRE	MJ	1.76E +04	2.9E+02	4.12E +01	0	0	0	0	0	1.97E +02	1.97E +00	-1.49E +04	-1.76E +04	2.36E +03	-1.5E+04	0
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	1.76E +04	2.9E+02	4.12E +01	0	0	0	0	0	1.97E +02	1.97E +00	-1.49E +04	-1.76E +04	2.36E +03	-1.5E+04	0
SM	kg	1.37E +02	0	0	0	0	0	0	0	0	0	8.24E +02	0	-1.37E +02	7.58E +02	0
RSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FW	m ³	1.2E+01	4.34E-02	3.95E-03	0	0	0	0	0	5.23E-02	5.23E-04	-1.52E +02	-1.2E+01	2.4E+01	-1.35E +02	0

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw



materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

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

Parameter	Unit	A1-A3	C1	C2	C3	C3/1	C3/2	C3/3	C4	C4/1	C4/2	C4/3	D	D/1	D/2	D/3
HWD	kg	-1.37E-07	4.5E-08	1.58E-09	0	0	0	0	0	0	4.91E-08	4.91E-10	-1.12E-04	1.38E-07	1.76E-05	-9.8E-05
NHWD	kg	2.02E+01	3.28E-02	6.73E-03	0	0	0	0	0	0	1E+03	1E+01	1.8E+02	-2.02E +01	-2.85E +01	1.56E+02
RWD	kg	7.77E-02	1.7E-03	7.51E-05	0	0	0	0	0	0	2.07E-03	2.07E-05	1.63E-03	-7.77E-02	-2.58E-04	-7.12E-03
CRU	kg	0	0	0	0	1E+03	0	1.1E+02	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	1E+03	0	0	8.8E+02	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:

	ton not rolled steel out															
Parameter	Unit	A1-A3	C1	C2	C3	C3/1	C3/2	C3/3	C4	C4/1	C4/2	C4/3	D	D/1	D/2	D/3
РМ	Disease incidence	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
IR	kBq U235 eq	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETP-fw	CTUe	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-c	CTUh	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-nc	CTUh	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SQP	SQP	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

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.

The results of the optional/additional impact indicators are not declared in the EPD as the uncertainties on these results are high or as there is limited experience with these indicators.

References

Standards

EN 15804

EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products.

ISO 14025

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

Further References

IBU 2024

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LCA FE (GaBi) Software / Database

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Sphera Solution GmbH, Leinfelden-Echterdingen, 2024, http://documentation.gabi-software.com

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Product Category Rules for Building-Related Products and Services, Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019, version 1.4, Institut Bauen und Umwelt e.V., www.bau-umwelt.com, 2024

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SteelConstruction-info

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