

# 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)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-TKS-20240543-CBC1-EN
Issue date	29.01.2025
Valid to	28.01.2030

## Zinc-magnesium coated steel coil thyssenkrupp Steel Europe AG

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## General Information

### thyssenkrupp Steel Europe AG

#### Programme holder

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

#### Declaration number

EPD-TKS-20240543-CBC1-EN

#### This declaration is based on the product category rules:

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

#### Issue date

29.01.2025

#### Valid to

28.01.2030



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



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

### Zinc-magnesium coated steel coil

#### Owner of the declaration

thyssenKrupp Steel Europe AG  
Kaiser-Wilhelm-Straße 100  
47166 Duisburg  
Germany

#### Declared product / declared unit

The declared unit is 1 metric ton of zinc-magnesium coated steel coil

#### Scope:

This environmental product declaration refers to steel coils with a zinc-magnesium coating produced at the facilities of thyssenkrupp Steel Europe AG in Duisburg, Bochum, Dortmund, Eichen and Ferndorf (Germany).

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	
<input type="checkbox"/>	internally
<input checked="" type="checkbox"/>	externally



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

## Product

### Product description/Product definition

This Environmental Product Declaration refers to steel coils with a zinc-magnesium coating. The hot-dip coated steel has optimum mechanical and physical properties. Due to customers requirements a surface treatment such as oiling is possible.

No Declaration of Performance in accordance with the CPR or similar legal provisions is required to place the product on 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

The zinc-magnesium coated steels can be used in different industrial applications, such as:

- Agricultural and machinery segments
- Automotive supply industry
- Commercial vehicle industry
- Construction industry
- Household--appliance industry
- House Technology
- Solar industry
- Tube and section industry

and further industrial applications.

### Technical Data

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

standards.

### Constructional data

Name	Value	Unit
Thickness of the sheet	0.15 - 6	mm
Maximum widthness	2100	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

Zinc-magnesium coated steel products can be used in various applications. Therefore, the lifetime of the products differs significantly and a reference service life cannot be declared.

## LCA: Calculation rules

### Declared Unit

The declared unit is 1 ton of zinc-magnesium coated 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 <sup>3</sup>
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 CO<sub>2</sub>e/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 % Recycling
- Scenario 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 - zinc-magnesium coated steel coil.

**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 zinc-magnesium coated 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
GWP-total	kg CO <sub>2</sub> eq	2.32E+03	2.1E+01	3.18E+00	0	0	0	0	0	0	1.5E+01	1.5E-01	-1.55E+03	-2.32E+03	1.91E+02	-1.6E+03
GWP-fossil	kg CO <sub>2</sub> eq	2.31E+03	2.1E+01	3.21E+00	0	0	0	0	0	0	1.5E+01	1.5E-01	-1.56E+03	-2.31E+03	1.92E+02	-1.61E+03
GWP-biogenic	kg CO <sub>2</sub> eq	1.85E+00	-8.58E-02	-8.04E-02	0	0	0	0	0	0	-1.03E-01	-1.03E-03	9.19E+00	-1.86E+00	-1.13E+00	7.8E+00
GWP-luluc	kg CO <sub>2</sub> eq	1.18E+00	1.16E-02	5.26E-02	0	0	0	0	0	0	8.98E-02	8.98E-04	-2.07E-01	-1.17E+00	2.56E-02	-3.1E-01
ODP	kg CFC11 eq	2.16E-09	8.98E-12	4.61E-13	0	0	0	0	0	0	4.04E-11	4.04E-13	2.09E-09	-2.16E-09	-2.58E-10	1.58E-09
AP	mol H <sup>+</sup> eq	4.26E+00	1.94E-01	4.16E-03	0	0	0	0	0	0	1.06E-01	1.06E-03	-3.81E+00	-4.26E+00	4.7E-01	-3.79E+00
EP-freshwater	kg P eq	2.76E-03	1.06E-04	1.34E-05	0	0	0	0	0	0	3.4E-05	3.4E-07	-3.63E-04	-2.76E-03	4.48E-05	-6.2E-04
EP-marine	kg N eq	1.23E+00	9.93E-02	1.5E-03	0	0	0	0	0	0	2.74E-02	2.74E-04	-6.13E-01	-1.23E+00	7.55E-02	-6.69E-01
EP-terrestrial	mol N eq	1.34E+01	1.09E+00	1.78E-02	0	0	0	0	0	0	3.01E-01	3.01E-03	-5.49E+00	-1.34E+01	6.77E-01	-6.25E+00
POCP	kg NMVOC eq	3.85E+00	2.7E-01	4.16E-03	0	0	0	0	0	0	8.37E-02	8.37E-04	-2.49E+00	-3.85E+00	3.07E-01	-2.59E+00
ADPE	kg Sb eq	2.52E-02	2.79E-06	2.73E-07	0	0	0	0	0	0	9.7E-07	9.7E-09	-8.83E-03	-2.52E-02	1.09E-03	-1.05E-02
ADPF	MJ	2.08E+04	2.9E+02	4.12E+01	0	0	0	0	0	0	1.97E+02	1.97E+00	-1.55E+04	-2.08E+04	1.91E+03	-1.58E+04
WDP	m <sup>3</sup> world eq deprived	5.83E+02	1.31E+00	4.85E-02	0	0	0	0	0	0	1.71E+00	1.71E-02	-1.05E+02	-5.83E+02	1.3E+01	-1.56E+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 - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 ton zinc-magnesium coated 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	1.73E+03	1.61E+01	3.55E+00	0	0	0	0	0	3.44E+01	3.44E-01	6.12E+02	-1.73E+03	-7.55E+01	3.43E+02	0
PERM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERT	MJ	1.73E+03	1.61E+01	3.55E+00	0	0	0	0	0	3.44E+01	3.44E-01	6.12E+02	-1.73E+03	-7.55E+01	3.43E+02	0
PENRE	MJ	2.08E+04	2.9E+02	4.12E+01	0	0	0	0	0	1.97E+02	1.97E+00	-1.55E+04	-2.08E+04	1.91E+03	-1.58E+04	0
PENRM	MJ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	MJ	2.08E+04	2.9E+02	4.12E+01	0	0	0	0	0	1.97E+02	1.97E+00	-1.55E+04	-2.08E+04	1.91E+03	-1.58E+04	0
SM	kg	1.11E+02	0	0	0	0	0	0	0	0	0	8.89E+02	0	-1.11E+02	7.87E+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 <sup>3</sup>	2.44E+01	4.34E-02	3.95E-03	0	0	0	0	0	5.23E-02	5.23E-04	-1.58E+02	-2.44E+01	1.94E+01	-1.4E+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 zinc-magnesium coated 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	6.2E-04	4.5E-08	1.58E-09	0	0	0	0	0	0	4.91E-08	4.91E-10	-1.16E-04	-6.2E-04	1.43E-05	-1.69E-04
NHWD	kg	4.86E+01	3.28E-02	6.73E-03	0	0	0	0	0	0	1E+03	1E+01	1.88E+02	-4.86E+01	-2.31E+01	1.58E+02
RWD	kg	2.53E-01	1.7E-03	7.51E-05	0	0	0	0	0	0	2.07E-03	2.07E-05	1.7E-03	-2.53E-01	-2.09E-04	-2.63E-02
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:

### 1 ton zinc-magnesium coated 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
PM	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 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

Institut Bauen und Umwelt e.V.: General Instructions for the EPD programme of Institut Bauen und Umwelt e.V., Version 2.0, Berlin: Institut Bauen und Umwelt e.V., [www.ibuepd.com](http://www.ibuepd.com)

#### LCA FE (GaBi) Software / Database

LCA FE, Software and Database for Life Cycle Engineering,

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

#### 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 according to EN 15804+A2:2019, version 1.4, Institut Bauen und Umwelt e.V., [www.bau-umwelt.com](http://www.bau-umwelt.com), 2024

#### PCR, Part B

Requirements on the EPD for Structural steels – Institut Bauen und Umwelt e.V., Königswinter (pub.): From the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU), version /v 11, 2024

#### Sansom, M. / Meijer, J.

Life-cycle assessment (LCA) for steel construction, Ascot, Culemborg, 2002

#### SteelConstruction-info

[https://www.steelconstruction.info/The\\_recycling\\_and\\_reuse\\_survey](https://www.steelconstruction.info/The_recycling_and_reuse_survey)



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