Environmental Product Declaration

Cold rolled SSAB Zero™ steel sheets and coils

EPD of multiple products, based on worst-case results

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021

Programme: The International EPD® System, www.environdec.com
Programme operator: EPD International AB
EPD owner: SSAB Europe Oy
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Valid until: 2030-01-20

Contents

1. General information

PROGRAM INFORMATION

Program:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
Email:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
Core product category rules: CEN standard EN 15804 serves as the core PCR.
Product category rules: PCR 2019:14 Construction products. Version 1.3.4. Date 2024-04-30.
Product group classification: UN CPC 412.
PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
Life Cycle Assessment (LCA)
LCA accountability: Lisa Hallberg, IVL Swedish Environmental Research Institute.
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: David Althoff Palm, Dalemarken AB. Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No [Procedure for follow-up the validity of the EPD is at minimum required once a year with the aim of confirming whether the information in the EPD remains valid or if the EPD needs to be updated during its validity period. The follow-up can be organized entirely by the EPD owner or together with the original verifier via an agreement between the two parties. In both approaches, the EPD owner is responsible for the procedure being carried out. If a change that requires an update is identified, the EPD shall be re-verified by a verifier]

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterization factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

1.1 SSAB'S VISION – A STRONGER, LIGHTER AND MORE SUSTAINABLE WORLD

SSAB is a global steel company with a leading position in high-strength steels and related services. The company is a frontrunner in the green transformation of the steel industry and aims to largely eliminate carbon dioxide emissions from its operations and together with suppliers and customers create a fossil-free value chain.

SSAB's production sites are in Sweden, Finland and the USA and have an annual crude steel production capacity of 8.8 million tonnes. SSAB Europe is responsible for sales of strip, heavy plate, and tubular products in Europe as well as for the global business in the Automotive customer segment. SSAB Special Steels has global responsibility for sales of SSAB's quenched and tempered (Q&T) steels and advanced high-strength steels (AHSS). SSAB Americas is the largest heavy plate producer in North America and has a strong position based on cost efficiency and quality. During 2023, the company started production of SSAB Zero™, a steel based on recycled steel and made using primary fossil-free electricity, biocoal and biofuels.

SSAB Zero™ steels are 100 % recyclable and are made from a unique production process using 100 % recycled steel. This reduces the environmental impacts of steelmaking while maintaining SSAB's strict quality standards.

1.2 COMPANY INFORMATION

EPD owner:
SSAB Europe Oy, Kaisa Ahvonen, Harvialantie 420, 13300 Hämeenlinna, Finland.

Description of the organizations:
- SSAB Europe is responsible for strip, heavy plate, and tubular products in Europe as well as for the global business in the Automotive customer segment. SSAB Europe is also responsible for color coated products.
- SSAB Americas is responsible for heavy plate products in North America and for SSAB Zero slabs for SSAB Europe.

Name and location of production sites:
- SSAB Americas (Iowa, USA): 1770 Bill Sharp Boulevard, Muscatine, 52761 Iowa (USA).
- SSAB EMEA AB (Borlänge, Sweden): Kontorsviksvägen 1, 781 84 Borlänge (Sweden).
- SSAB Europe Oy (Hämeenlinna, Finland): Harvialantie 420, 13300 Hämeenlinna (Finland).

Certifications:
Certificates applicable to SSAB sites are ISO 14001 and ISO 9001.

Contact:
EPDssab@ssab.com.

2. Product information

2.1 PRODUCT TECHNICAL INFORMATION AND APPLICATIONS

SSAB specializes in materials for demanding applications where high strength and formability are needed for weight savings and increased durability. Cold rolled steels are used in many industries and applications, including the automotive industry, light engineering, domestic and electrical appliances, heating and air conditioning equipment, and tubes and sections.

SSAB offers a comprehensive selection of steel products that include cold-forming steels, advanced high-strength steels, complex phase steels, martensitic steels, ultrahigh-strength steels, weather-resistant steels and hardenable boron steels.

Cold rolled steels are produced in a thickness range of 0.35 – 3.0 mm. Products are delivered as coils, cut-to-length sheets and slit coils.

The products are often customized to meet national and/or international standards as well as customer-specific or other Original Equipment Manufacturer (OEM) standards. Besides standardized steel grades, SSAB's cold rolled product portfolio also includes products unique to SSAB and which in some cases may be patented.

For more detailed information about technical product properties and the product portfolio, please visit www.ssab.com.

2.2 PRODUCT DESCRIPTION

The scope of this EPD is Cold rolled SSAB Zero™ steel sheets and coils. SSAB Zero™ is made using 100 % recycled steel, of which over 90 % comes from external scrap (post- and pre-consumer) and the remainder from internal scrap from the manufacturing process.

The steel is an alloy of mainly iron and carbon and may contain other alloying metals and trace elements. These alloying elements improve the chemical and physical properties of steel, such as strength, ductility, and durability and corrosion resistance.

The exact composition of the steel manufactured by SSAB depends on product requirements, either based on national and/or international standards, such as EN 10130 or EN 10268, or on customer-specific and/or other OEM standards. SSAB's unique products also have their own specific requirements.

Content declaration and average chemical composition is presented in section 4.2. More detailed information on the different steel compositions is available from national and international standards, and on www.ssab.com.

2.3 LABELING AND PACKAGING

SSAB products are labeled to be easily identifiable and traceable. The packaging and protection type of SSAB steel products is specified when ordering.

Steel bands or strappings, wood props, paper or plastic film, corner protection and other accessories supporting packaging are used as appropriate, depending on the protection needed. Paper and plastic film are usually used for cut-to-lengths packaging. The bundles are fastened with strap bands.

Depending on orders, coils can be delivered fastened with or without a base, protected with cardboard or laminated plastic, and plastic or metallic end rings, metallic corner protection and strapping bands.

3. Production and transportation

3.1 PRODUCTION SITES

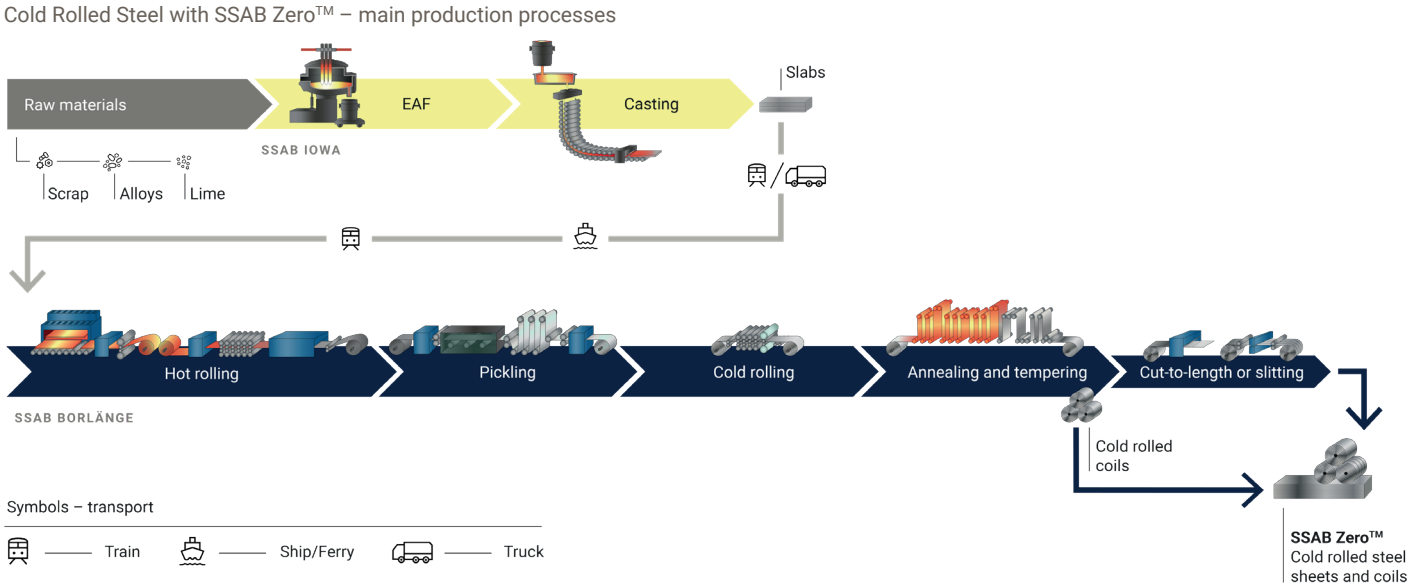
SSAB Zero™ steel slabs are manufactured at SSAB Iowa in the USA. Production is based on an electric arc furnace (EAF) using scrap steel as a raw material and primary fossil-free electricity, biocoal and biofuels. Scrap steel along with raw materials, such as charge/injection carbon, lime and other additives, are added to the EAF, where electricity is used to melt the batch and make molten steel. The molten steel is cast into slabs.

SSAB Zero™ steel slabs are shipped to Sweden, where they are hot rolled, pickled, cold rolled, annealed and tempered, and cut-to-length or slit at SSAB Borlänge.

Note that after hot rolling at SSAB Borlänge, pickling, cold rolling, annealing, tempering, cut-to-length or slitting can also be done at SSAB Hämeenlinna.

Co-products, such as slag, mill scale and iron oxide, generated from SSAB's steel production processes are recycled as industrial raw materials or materials to replace virgin resources. A high percentage of the baghouse dust originating from the EAF process is recycled to reduce waste and improve efficiency. However, no emissions were allocated to co-products in this EPD.

FIGURE 1. SSAB Zero™ production sites and transportation between sites.



Note: After hot rolling at SSAB Borlänge, pickling, cold rolling, annealing, tempering, cut-to-length or slitting can be done at SSAB Hämennlinna.

3.2 TRANSPORTATION

SSAB Zero™ steel slabs from SSAB Iowa in the USA are transported via rail or truck to a port and shipped to Sweden, where they are transported by rail to SSAB Borlänge and possibly shipped from SSAB Borlänge to Finland and transported by truck to SSAB Hämeenlinna.

4. LCA

4.1 LCA INFORMATION

Declared unit:
1 kg of product

Reference service life:
Not applicable

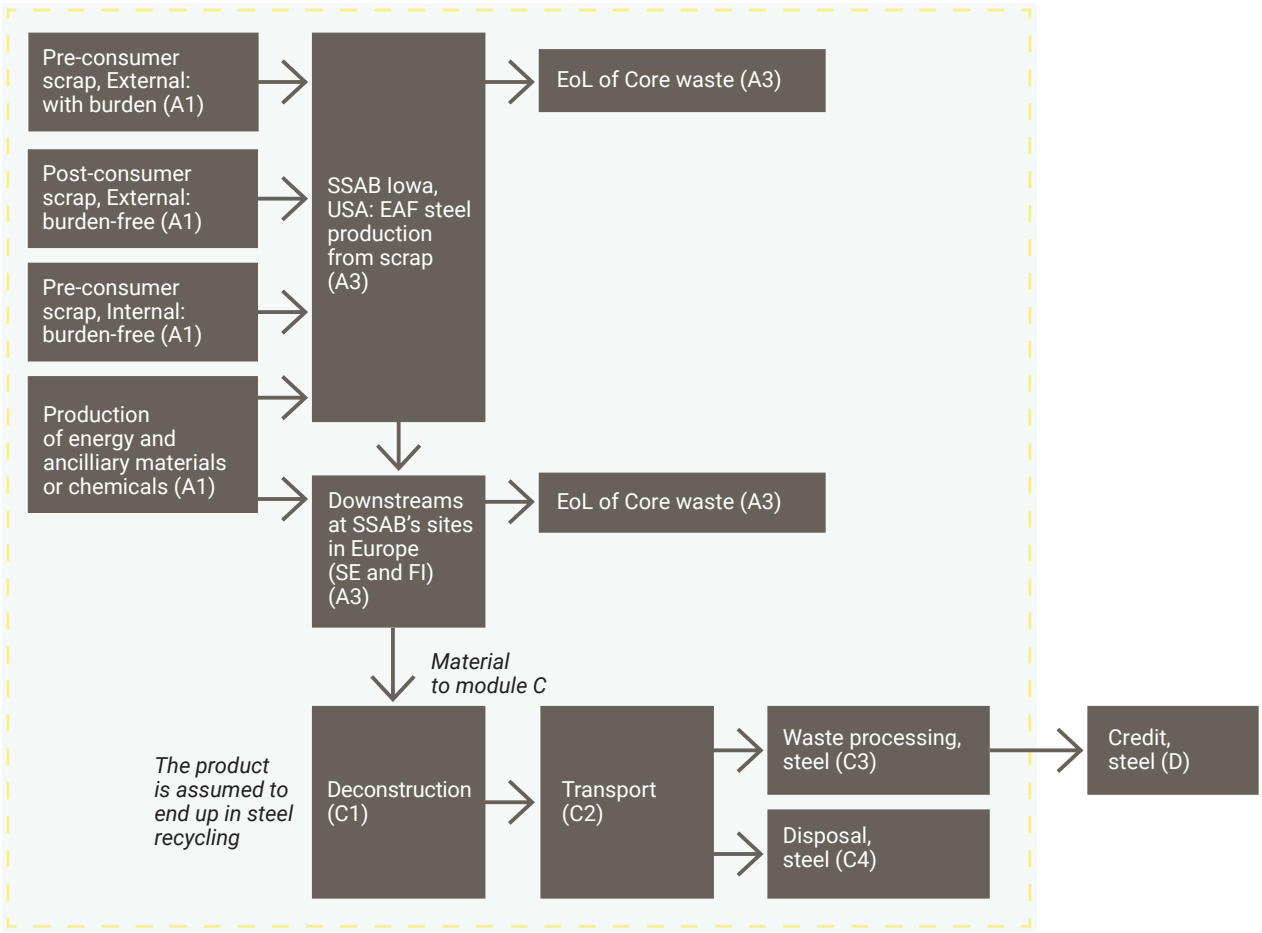
Description of system boundaries:
The system boundaries are cradle-to-gate with modules C1 – C4 and module D.

Time representativeness:
2023 for the slabs production at SSAB Iowa,
2022 for the steel processing at SSAB Borlänge,
2021 for the steel processing at SSAB Hämeenlinna,
H2/2023 – H1/2024 for fossil-free electricity and biofuels used at SSAB Borlänge and SSAB Hämeenlinna.

The data for fossil-free electricity and biofuels is from a period when SSAB Zero has been produced. The other data is from a representative full year of the production process where SSAB Zero is produced today.

Database(s) and LCA software used:
The LCA was modelled using the LCA software LCA for Experts and corresponding database (version 2024.1) provided by Sphera.

System diagram:



- Module A1: Production of raw materials and production of fuels
- Module A2: Transportation of raw materials to SSAB's manufacturing site (including transportation of steel between SSAB sites)
- Module A3: Manufacturing of steel products and management of production waste
- Module C1: Deconstruction of the product
- Module C2: Transport to waste processing and disposal
- Module C3: Waste processing of the product, to be sent to steel recycling
- Module C4: Disposal of the remaining part of the product in a landfill
- Module D: Benefits from recycling the steel

Allocation:
Pre-consumer scrap is used in the production of steel. The environmental burden from the use of this scrap is allocated based on economic value by making a conservative assumption equal to 5 % of virgin (blast furnace-based) steel. This corresponds to a value of 0.1 kg CO_2eq per kg of pre-consumer scrap.

Co-product allocation has been applied to the scrap generated in modules A1 – A3 as per PCR 2019:14, wherein the impacts are allocated to the declared product, based on negligible economic value to scrap as compared to the steel products.

Cut-off criteria:
The maximum cut-off criteria established by the PCR and EN 15804:2012+A2:2019 standard is 1 % of all material and energy flows to a single unit process and 5 % of total inflows (mass and energy) to the upstream and core module. No cut-offs exceeding this limit have been made.

Inclusion of infrastructure and capital goods:
Infrastructure and capital goods are not included in any of the modules covered in this EPD. For the electricity sources of renewable origin (within the residual mix), the infrastructure of the power plant is included.

Electricity information:
The electricity used in the production of the steel slabs at SSAB Iowa is a mix supported by a contractual document. The mix is based on 99.2 % wind, 0.6 % solar and 0.1 % biomass, corresponding to a GWP-GHG impact of 0.0095 kg CO^2eq per kWh.

At SSAB Borlänge and SSAB Hämeenlinna, only external electricity is used. The residual electricity mix for Sweden has been applied (corresponding to a GWP-GHG impact of 0.07 kg CO_2eq per kWh). The residual electricity mix for Finland has been applied (corresponding to a GWP-GHG impact of 0.5 kg CO_2eq/kWh).

Scenario for module C1:
The product is being deconstructed by a machine powered by diesel.

Scenario for module C2:
The waste is transported 150 km by truck to waste processing (C3) and disposal (C4).

Scenario for module C3:
98 % of the product is assumed to be processed in order to be sent for recycling in an EAF.

Scenario for module C4:
2 % of the product is assumed to be disposed of as waste at a landfill.

Scenario for module D:
The environmental benefit of the recycled steel is gained through the avoided production of primary steel. This benefit corresponds to -1.7 kg CO_2eq per kg of scrap in module D. The net flow of the recycled steel being credited in module D corresponds to 0.16 kg and is based on an assumed recycling rate of 98 % and an assumption of yield losses in the steel recycling process.

Worst case results for the EPD:
The results represent a worst case results for the product group.

Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation

Life cycle stage	Module		Modules declared	Geography	Specific data used	Variation - products	Variation - sites
Product stage	Raw material supply	A1	X	US	50 %	-31 %	0 %
	Transport	A2	X	US & EU			
	Manufacturing	A3	X	US & SE			
Construction process stage	Transport	A4	ND	-	-	-	-
	Construction installation	A5	ND	-	-	-	-
Use stage	Use	B1	ND	-	-	-	-
	Maintenance	B2	ND	-	-	-	-
	Repair	B3	ND	-	-	-	-
	Replacement	B4	ND	-	-	-	-
	Refurbishment	B5	ND	-	-	-	-
	Operational energy use	B6	ND	-	-	-	-
	Operational water use	B7	ND	-	-	-	-
End of life stage	De-construction demolition	C1	X	EU	-	-	-
	Transport	C2	X	EU	-	-	-
	Waste processing	C3	X	EU	-	-	-
	Disposal	C4	X	EU	-	-	-
Resource recovery stage	Reuse-Recovery-Recycling-potential	D	X	EU	-	-	-

X: Module Declared
ND: Module not declared
**A5 is partly declared i.e. only waste management of the packaging materials is covered. The "uptake" of biogenic CO_2 in the production phase of the packaging materials (A1) is here in A5 "neutralised" by the biogenic CO_2 generated at incineration.*

4.2 PRODUCT CONTENT DECLARATION

External pre- and postconsumer scrap is 89.7 %. Recycled material content with internal pre-consumer scrap is 98.0 %.

Content declaration and average chemical composition of cold rolled SSAB Zero™ steel sheets and coils per kg produced is:

Product Composition	Weight (%)	Weight (kg)	Biogenic carbon, weight (%)	Biogenic carbon, weight (kg)
Pre-consumer scrap, External	8.3 %	0.08	0 %	0
Post-consumer scrap, External	81.4 %	0.81	0 %	0
Pre-consumer scrap, Internal	8.3 %	0.08	0 %	0
Alloys	2.0 %	0.02	0 %	0
Average chemical composition*				
Iron (Fe)	> 97 %			
Manganese (Mn)	0.6 %			
Silicon (Si)	0.3 %			
Carbon (C)	0.1 %			
Other	< 1.5 %			

**SSAB Zero™ is based on recycled scrap, which may contain small amounts of residual elements such as copper and tin. The figures provided represent the best estimate at the time of publication.*

Content Declaration of packaging material	Weight (kg)	Weight % (of product)	Biogenic carbon, weight (kg/declared unit)
Wood	0.004	0.40 %	0.0017
Plastic	0.001	0.10 %	
Metal	0.001	0.10 %	

The production of the packaging materials has been omitted since it falls under the cut-off limit. The content of biogenic material in the packaging is 0.0017 kg per kg of steel.

Cold rolled SSAB Zero™ steel sheets and coils do not contain any of the substances of very high concern (SVHC) regulated by Regulation (EC) No 1907/2006 (REACH) or Regulation (EC) No 1272/2008 of the European Parliament and of the Council.

4.3 ENVIRONMENTAL PERFORMANCE INDICATORS RESULTS

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. Usage of results from A1 – A3 without considering the results of module C is not encouraged.

Potential environmental impact – mandatory indicators according to EN 15804+A2 (version EF 3.1)

Results per declared unit: 1 kg of product								
Indicator		**Unit**	**A1 – A3**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential (GWP)	Climate Change - fossil	kg CO_2 eq	0.697	4.39E-04	1.01E-02	2.71E-03	2.99E-04	-0.285
	Climate Change - biogenic	kg CO_2 eq	3.73E-03	1.34E-06	2.68E-05	1.01E-05	9.52E-07	6.06E-05
	Climate Change - land use and land use change (LULUC)	kg CO_2 eq	1.16E-03	7.31E-06	8.61E-05	3.66E-05	1.80E-06	-3.79E-05
	Climate Change - total	kg CO_2 eq	**0.702**	4.47E-04	1.03E-02	2.76E-03	3.02E-04	-0.285
Depletion potential of the stratospheric ozone layer (ODP)		kg CFC-11 eq	4.43E-12	4.39E-17	1.34E-18	4.89E-15	8.08E-16	3.83E-13
Acidification potential (AP)		mole H+ eq	2.42E-03	3.01E-06	1.18E-05	1.36E-05	2.13E-06	-6.97E-04
Eutrophication potential (EP)	Freshwater	kg P eq	1.44E-05	1.86E-09	3.12E-08	1.05E-08	6.80E-10	-6.64E-08
	Marine	kg N eq	6.82E-04	1.49E-06	3.93E-06	6.24E-06	5.47E-07	-1.12E-04
	Terestrial	mole N eq	7.43E-03	1.65E-05	4.74E-05	6.90E-05	6.03E-06	-1.00E-03
Formation potential of tropospheric ozone (POCP)		kg NMVOC eq	1.97E-03	2.89E-06	1.01E-05	1.73E-05	1.67E-06	-4.55E-04
Abiotic depletion potential (ADP)	Minerals and metals*	kg Sb eq	1.23E-06	3.71E-11	8.05E-10	2.84E-09	1.94E-11	-1.61E-06
	Fossil resources*	MJ	11.6	5.68E-03	0.140	5.07E-02	3.95E-03	-2.83
Water scarcity potential (WDP)*		m^3	0.188	6.48E-06	9.13E-05	5.18E-04	3.43E-05	-1.92E-02

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*
Note: Biogenic carbon in packaging is balanced in A1 – A3.

Additional mandatory and voluntary impact category indicators

Results per declared unit: 1 kg of product								
Indicator		**Unit**	**A1 – A3**	**C1**	**C2**	**C3**	**C4**	**D**
Global warming potential (GWP)	GWP-GHG (1)	kg CO_2 eq	0.702	4.47E-04	1.03E-02	2.76E-03	3.02E-04	-0.285

(1) This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the characterization factor for biogenic CO_2 is set to zero.

Resource use indicators

Results per declared unit: 1 kg of product								
Indicator		**Unit**	**A1 – A3**	**C1**	**C2**	**C3**	**C4**	**D**
Primary energy resources – Renewable	Used as energy carrier (PERE)	MJ	9.44	4.80E-04	7.81E-03	5.41E-03	6.89E-04	0.112
	Used as raw materials (PERM)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Total (PERT)	MJ	9.44	4.80E-04	7.81E-03	5.41E-03	6.89E-04	0.112
Primary energy resources – Non-renewable	Used as energy carrier (PENRE)	MJ	11.6	5.68E-03	0.140	5.07E-02	3.95E-03	-2.83
	Used as raw materials (PENRM)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Total (PENRT)	MJ	11.6	5.68E-03	0.140	5.07E-02	3.95E-03	-2.83
Use of secondary material (SM)		kg	1.22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (RSF)		MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non renewable secondary fuels (NRSF)		MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water (FW)		m^3	6.84E-03	5.39E-07	8.94E-06	1.51E-05	1.05E-06	-2.88E-02

Note: Primary energy calculated using PCR option B.

Waste indicators

Results per declared unit: 1 kg of product							
Indicator	**Unit**	**A1 – A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed (HWD)	kg	3.56E-08	1.84E-13	7.06E-12	7.33E-12	9.84E-13	-2.12E-08
Non-hazardous waste disposed (NHWD)	kg	2.94E-02	8.84E-07	2.08E-05	1.39E-05	2.00E-02	3.43E-02
Radioactive waste disposed (RWD)	kg	1.20E-03	7.34E-09	1.70E-07	6.38E-07	4.15E-08	3.10E-07

Output indicators

Results per declared unit: 1 kg of product							
Indicator	**Unit**	**A1 – A3**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use (CRU)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling (MFR)	kg	0.00E+00	0.00E+00	0.00E+00	0.980	0.00E+00	0.000
Material for energy recovery (MER)	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported electrical energy (EEE)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy (EET)	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Disclaimer

ILCD classification	Indicator	Disclaimer
ILCD Type 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD Type 2	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD Type 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted Water (user) deprivation potential, deprivation-weighted	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2

Disclaimer 1 – 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 due to 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 – 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 experienced with the indicator.

Variation in environmental indicators

The table below shows the variation for modules A – C where the difference between products is greater than 10 %.

Cold rolled SSAB Zero™ steel sheets and coils	
Environmental impact indicator	**Difference (%)**
GWP-GHG	31 %
GWP-fossil	31 %
GWP-biogenic	16 %
GWP-LUC	17 %
GWP-total	31 %
ODP	43 %
AP	16 %
EP-marine	16 %
EP-terrest	17 %
POCP	17 %
ADP-elements	11 %
ADP-fossil	35 %

5. References

- General Programme Instructions of the International EPD® System. Version 4.0.
- PCR 2019:14 Construction products. Version 1.3.4 (2024-04-30)
- CEN European Committee for Standardisation (2021). EN15804:2012+A2:2019/ AC:2021 (CEN 2021), Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.
- LCA for experts Software System and database for Life Cycle Engineering, sphera, Leinfelden-Echterdingen, Germany
- Hallberg, L., LCA methodology report – SSAB Zero, as basis for publication of EPD, Nov 2024

SSAB

www.ssab.com