



**OVAKO**

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 for:

# **HOT-ROLLED BAR STEEL PRODUCT IN IMATRA**

The International EPD® System [environdec.com](https://www.environdec.com)

Program operator: EPD International AB

EPD registration number: S-P-01369

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Validity date: 2029-03-27

Geographical scope: Global.

The production site is Imatra, Finland

 **EPD**®



# ENVIRONMENTAL PRODUCT DECLARATION



## Owner of the EPD

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## Description of the organization

Ovako is a producer of engineering steel.

## Product-related or management system-related certifications

Certified compliance with ISO 9001, ISO 14001, ISO 45001 and IATF 16949-certificates

## Name and location of production site

Imatra, Finland

## About the company

Ovako is a leading European producer of engineering steel for customers in the bearing, transport and manufacturing industries. Ovako's customers are found mainly in the European engineering industry and its subcontractors. The steel production is based on scrap, making Ovako one of the Nordic region's largest recycler of steel scrap. Customers are generally leading manufacturers in their segments, which place high demands on the properties of the steel.

Beside the lake Saimaa and river Vuoksi in southeast Finland lies the city of Imatra. Around 550 people work at Ovako's facility, often in close cooperation with the customers, to create innovative solutions that help to build a better future. Among other things, Ovako develops and manufactures innovative high-tech steel for the demanding automotive and engineering industries.

The steel produced by Ovako Imatra is used in a number of areas, including power transmission and equipment, axles, gears, crankshafts, springs, bearings, bolts and mining tools. Hot-rolled bars from Ovako Imatra are available in dimensions between 21,85–200 mm, and characterized by close tolerances, excellent straightness as well as roundness, good surfaces and low decarburization. This makes them ideally suited for forging and machining.

Ovako Imatra's steel makes the end products stronger and more durable. One important family of steel products produced in Imatra is M-Steel®, a steel developed for excellent machining properties, cost savings and improved productivity in the customer's process.

## Product information

**Product name**  
Hot-rolled bar steel product

**Product identification**  
Product name Carbon steels and Low alloyed steels. The steels are in the massive product forms; semi-finished bar products. The products are marketed under Ovako's trademarks, attribute brands and EN grade designations, also with designations according to various international and national standards.

**Product description**  
The declared unit is 1 tonne (1000 kg) of hot-rolled heavy bar steel product at Ovako gates from their production site in Imatra. With respect to alloying content, the product represents an average hot rolled bar from the site. The average consists of different steel qualities with alloying content varying according to the Content declaration below. With respect to finishing, the products are hot-rolled, ground and blasted.

As can be seen in the figure below, the main inputs to the steel making are scrap, alloys, coal, electrodes, fuels, oxygen and inbound transportation. Scrap is melted in the electric arc furnace, alloyed in the ladle furnace and casted to blooms. The blooms go straight to the heavy section rolling mill and are reheated, hot-rolled, grinded and blasted. Major additional processes include waste and slag handling and treatment of emissions to water and air.

**UN CPC code**  
412

**Geographical scope**  
Global

## LCA information

**Functional unit/declared unit**  
1 tonne (1000 kg) of hot-rolled bar steel product.

**Reference service life**  
Not applicable.

**Time representativeness**  
Production data are from 2022. Electricity mix data are from 2022.

**Database(s) and LCA software used**  
Ecoinvent 3 as applied in SimaPro 9.5.0.0, 2024. For calculation of environmental impacts, the method EN15804 + A2 (adapted) AP & EP Version 1.00 in SimaPro was used. Primary energy demand was calculated with the method Cumulative Energy Demand (LHV) version 1.10.

**Description of system boundaries**  
Cradle-to-gate for a hot rolled bar, see Figure 1.

**Cut-off criteria**  
Cut-off allocation of waste burdens and benefits in accordance with the polluter pays principle as stipulated in the PCR. Raw material inflows less than 0.0005% of the output flow was disregarded unless there were reasons to suspect significant environmental impact. Core process data from site production records and thus of good quality.

**Excluded lifecycle stages**  
Lifecycle stages after the heavy section rolling mill, e.g. further processing, downstream transportation, use stage and end-of-life stage are excluded since hot-rolled bar steel products can be used in many different applications with different requirements on the steel properties.

**More information**  
For more information on Ovako steel products. [ovako.com](http://ovako.com)

**Name and contact information of LCA practitioner**  
Mats Zackrisson at RISE Research Institutes of Sweden has carried out the underlying LCA study. [Mats.Zackrisson@ri.se](mailto:Mats.Zackrisson@ri.se)

**Additional information**  
Ovako is only sourcing fossil free electricity, which is reflected on the electricity mix used for all of Imatra's activities requiring electricity, e.g. melting and rolling operations. Natural gas is the main source for heating operations.

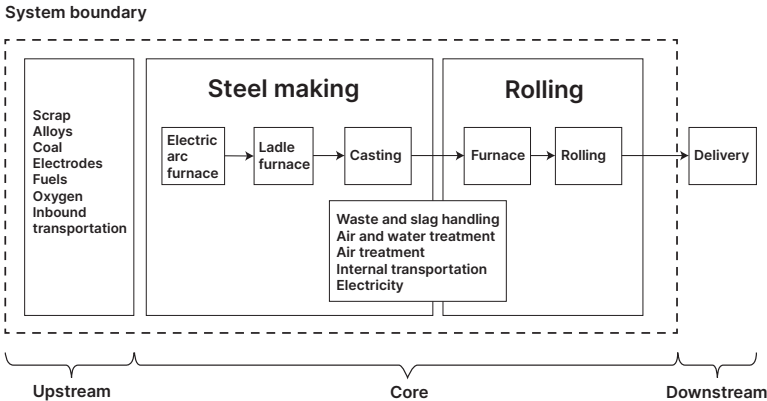


Figure 1. System boundaries for the hot-rolled bar steel product.

## Content declaration

### Products

Materials/Chemical substances	[kg/tonne]	%	Environmental/hazardous properties
Iron	Balance*	Balance*	
Nickel	0.7–34	0.07–3.4	Nickel is classified in EC Directive 67/548/EEC as a suspect carcinogen (category 3 – R40) and as a skin sensitizer (R43).
Chromium	0.9–43	0.09–4.3	
Molybdenum	0.1–10	0.01–1.0	
Manganese	3–16	0.3–1.6	

Standards describing the methods used for chemical composition analysis are: ASTM E 415-17 and ASTM E 1019-18.

\*) Alloy contents of steel are adjusted individually to meet product specifications of different steel grades and customer demands. Iron content of steel is controlled by alloys

Steel products are considered as articles under the European Regulation (EC) 1907/2006, concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH). All intentionally added alloying elements in Ovako products with the exception of nickel are not classified as hazardous. Nevertheless, there are certain substances covered by European and national chemical legislation and lists (REACH Annex XIV and XVII, RoHS-directive (2011/65/EC) Annex II and Global Automotive Declarable Substance List ("GADSL")) that cannot physically be measured in steel and others that are difficult to measure due to being present in very low levels. The alloying elements in low alloyed steel are firmly bonded in its chemical matrix. Due to this bonding and to the presence of a protective oxide film the release of any of the constituents is very low and negligible when the steel is used appropriately.

#### Distribution packaging

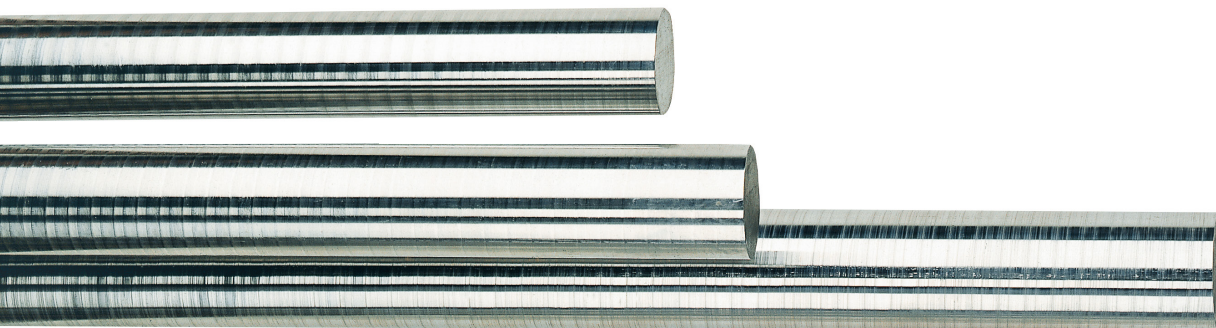
Not applicable.

#### Consumer packaging

Not applicable.

#### Recycled material

Provenience of recycled materials (pre-consumer or post-consumer) in the product: The hot-rolled bar steel product is made from 96% recycled steel and 4% alloying elements.



## Environmental performance

### Potential environmental impact per 1000 kg hot-rolled bar steel product

Parameter	Unit	Upstream	Core	Downstream	Total	
Global warming potential (GWP)	Fossil	kg CO2 eq.	308.11	176.70	ND	484.81
	Biogenic	kg CO2 eq.	1.10	0.23	ND	1.33
	Land use and land transformation	kg CO2 eq.	0.40	0.00	ND	0.40
	Total	kg CO2 eq.	310	177	ND	487
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	0.000014	0,0000002	ND	0.000014	
Acidification potential (AP)	mol H+ eq.	5.05	0.50	ND	5.55	
Eutrophication potential (EP), aq. freshwater	kg P eq.	0.09	0.0003	ND	0.09	
Eutrophication potential (EP), aq. marine	kg N eq.	0.32	0.12	ND	0.44	
Eutrophication potential (EP), aq. terrestrial	mol N eq.	3.41	1.36	ND	4.77	
Photochemical oxidant creation potential (POCP)	kg NMVOC eq.	1.76	0.34	ND	2.10	
Abiotic depletion potential – Metals and minerals	kg Sb eq.	0.03	0.00004	ND	0.03	
Abiotic depletion potential – Fossil resources	MJ, net calorific value	5514	1326	ND	6840	
Water deprivation potential (WDP)*	m3 world eq. deprived	218	232	ND	450	

### Use of resources per 1000 kg hot-rolled bar steel product

Parameter	Unit	Upstream	Core	Downstream	Total	
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	1096	7	ND	1103
	Use as raw materials	MJ, net calorific value	0	0	ND	0
	Total	MJ, net calorific value	1096	7	ND	1103
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	5511	1326	ND	6837
	Use as raw materials	MJ, net calorific value	0	0	ND	0
	Total	MJ, net calorific value	5511	1326	ND	6837
Secondary material	kg	1005	0	ND	1005	
Renewable secondary fuels	MJ, net calorific value	0	0	ND	0	
Non-renewable secondary fuels	MJ, net calorific value	0	0	ND	0	
Net use of fresh water	m3	2.1	10.0	ND	12,1	





#### Waste production per 1000 kg hot-rolled bar steel product

Parameter	Unit	Upstream	Core	Downstream	Total
Hazardous waste disposed <sup>1</sup>	kg	0	0	ND	0
Non-hazardous waste disposed <sup>1</sup>	kg	0	0	ND	0
Radioactive waste disposed <sup>1</sup>	kg	0	0	ND	0

<sup>1</sup>Please note that the amount of wastes and the destination shall be declared as output flows from the system only when the waste

treatment process is not included within the system boundaries. As all waste treatment processes are included in the system boundaries, the indicators are declared as zero.

#### Output flows per 1000 kg hot-rolled bar steel product

Parameter	Unit	Upstream	Core	Downstream	Total
Components for reuse	kg	ND	0	ND	0
Material for recycling	kg	0.17	638	ND	638.2
Materials for energy recovery	kg	0.04	0.29	ND	0.32
Exported energy, electricity	MJ	ND	0	ND	0
Exported energy, thermal	MJ	ND	0	ND	0

#### Information on recycling

Steel is 100 % recyclable as a raw material to new steel products.

#### Differences versus previous versions

The PCR has been updated since previous EPD of hot-rolled bar steel product from Imatra was published in 2019. This EPD shows lower climate impact in the

core processes due to reduction efforts undertaken in Imatra. However, the total climate impact is higher than the previous EPD: 489 kg CO<sub>2</sub>eq/tonne instead of 445, i.e. 9% increase. The increase is hence exclusively in upstream processes and mainly concerning climate impact. Half of the increase in climate impact is due to inclusion of refractory materials. The remaining half is due to smaller changes in several background datasets (Ecoinvent).

#### Difference between 2022 and 2019 in climate impact per 1000 kg hot-rolled bar steel product

Parameter	Unit	Upstream	Core	Downstream	Total
Global warming potential (GWP), Total 2022	kg CO <sub>2</sub> eq.	310	177	ND	487
Global warming potential (GWP), Total 2019	kg CO <sub>2</sub> eq.	257	188	ND	445

## Programme-related information and verification

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programmes may not be comparable.

### Program

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### EPD registration number

S-P-01369

### Originally published

2019-03-20

### Revision

2024-03-27

### Valid until

2029-03-27

### Product Category Rules

PCR 2015:03. BASIC IRON OR STEEL PRODUCTS & SPECIAL STEELS, EXCEPT CONSTRUCTION STEEL PRODUCTS. Version 2.1.0

### Product group classification

UN CPC 412

### Reference year for data

2022

### Geographical scope

Global

### PCR review was conducted by

The Technical Committee of the International EPD® System. Full list of TC members available on [environdec.com/TC](http://environdec.com/TC)

### Independent third-party verification of the declaration and data, according to ISO 14025:2006

- EPD process certification  
 EPD verification

### Third party verifier

Martyna Mikusinska

### Approved by

The International EPD® System

### Procedure for follow-up of data during EPD validity involves third party verifier

- Yes  
 No

## References

General Programme Instructions of the International EPD® System. Version 4.0.

PCR 2015:03. Name. PCR 2015:03. BASIC IRON OR STEEL PRODUCTS & SPECIAL STEELS, EXCEPT CONSTRUCTION STEEL PRODUCTS. Version 2.1.0

Environmental impact of Ovako hot rolled bar steel products from Imatra 2022. February 2024. Mats Zackrisson. Project Report 119775. RISE Research Institutes of Sweden.

Cradle-to-gate. Understanding CO<sub>2</sub> footprint of hot-rolled bar steel products. Ovako Group. 2019.

Vattenfall. 2022. EPD of Electricity from Vattenfall's Nuclear Power Plants. EPD registration number S-P 00923.

Ecoinvent 3.9.1, as implemented 2024 in SimaPro 9.5.0.0

SimaPro 9.5.0.0. Pré Consultants. 2019.

## Contact information

### EPD owner

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