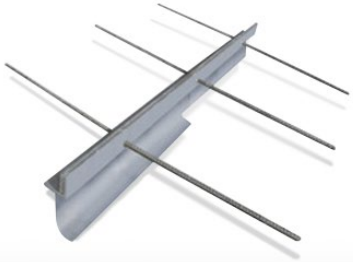
ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

Concrete slab components made from steel

EPD of multiple products, based on the average results of the product group



Programme operator: Rakennustieto EPD, Malminkatu 16 A, 00100 Helsinki, Finland
https://cer.rts.fi/

EPD registration number: RTS_407_25
Publication date: 18.8.2025
Valid until: 18.8.2030
Geographical scope: Finland

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The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but registered in different EPD programmes 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.

GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer and owner of the declaration	Semko Oy
Address	Tehtaantie 8, 60100 Seinäjoki
Contact details	mikko.ylisela@semko.fi
Website	semko.fi
Management system-related certification	ISO 9001, ISO 14001

Semko Oy's main products include concrete adhesion and fastening components, cement handling equipment, and lightweight steel structures. The selection comprises customized products based on customers' needs, in-house designed products, and standard products designed for fastening concrete elements.

Semko Oy's factory operates in accordance with the EN 1090-1:2009 + A1:2011 certificates. Production and products are supervised by Inspecta Oy and Nordcert AB. The quality system meets the requirements based on the SFS-EN ISO 9001 standard.

Semko Oy works as hard as its products perform, serving as a reliable partner to help meet deadlines. Their quality makes construction work easier.

EPD INFORMATION

EPD program operator	Rakennustieto EPD
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. In addition, RTS PCR version 260820 is used.
EPD author	Anna Pietilä anna.pietila@ains.fi Bertel Jungin aukio 9, 02600 Espoo A-Insinöörit Suunnittelu Oy www.ains.fi A-INSINÖÖRIT
Category of EPD	Third party verified EPD
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☒ External verification
Verification date	17.7.2025
EPD verifier	Sigita Židonienė Vesta Consulting UAB
EPD number	RTS_407_25
Publishing date	18.8.2025
EPD valid until	18.8.2030

PRODUCT INFORMATION

PRODUCT IDENTIFICATION

Product name	Concrete tile components made from steel
Additional labels	SLS – Expansion joint PBOK – Hollow-core slab hanger
Product number / reference	-
Place of production	Finland
CPC code	4219

PRODUCT DESCRIPTION AND APPLICATION

Steel components for concrete tiles, such as **expansion joints** and **hollow-core slab hangers**, maintain structural integrity. **Expansion joints** accommodate movement and ensure durability. **Hollow-core slab hangers** provide support for hollow-core slabs, enhancing stability and load distribution. These elements are essential for achieving reliable, long-lasting tiled surfaces in construction projects.

TECHNICAL SPECIFICATIONS AND PRODUCT STANDARDS

The products comply with the standard EN 1090-1:2009 + A1:2011. More information about the products covered by this EPD is available at https://semko.fi/fi/

PRODUCT RAW MATERIAL MAIN COMPOSITION

Main substances of the products covered by this EPD in declared unit (1 kg) are presented in Table 1.

Table 1. Product main composition

Product composition	Quantity mass-%	Material origin
Metals	100	GLO
Minerals		
Fossil materials		
Bio-based materials		

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate per declared unit:

Biogenic carbon content in product, kg C	0.0
Biogenic carbon content in packaging, kg C	0.012

1) 1 kg biogenic carbon is equivalent to 44/12 kg CO_2

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

PRODUCT STAGE (A1-A3)

The product stage is subdivided into three modules: A1 (Raw material supply), A2 (Transportation) and A3 (Manufacturing).

RAW MATERIALS A1

This stage covers the environmental impacts of manufacturing raw materials, for example emissions generated when raw materials are taken from nature. Raw material losses are also considered. This stage includes all raw materials which end up in the final products. In this case the product consist of steel or stainless steel and different components of welding.

TRANSPORTATION A2

The considered transportation impacts include exhaust emissions resulting from transportation of raw materials from suppliers to manufacturing facilities as well as the environmental impacts of the production of the fuel used. The transportation distances and methods were provided by the manufacturer.

MANUFACTURING A3

The environmental impacts considered for the production stage cover the manufacturing of materials used in the production but not included in the final products such as packaging materials and other ancillary materials. Also, fuels used by machines, as well as handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study considers also the losses occurring during the manufacturing processes. Also, the transmission losses of energy have been included. In this EPD ancillary materials include fuel, electricity, welding gases and treatment of production losses.

Table 2. Parameters for manufacturing energy use (stage A3)

Energy type	GWP-value	Data quality
Electricity	0.68 kg CO_2e/kWh	Electricity, Finland, residual mix (One Click LCA)
Fuel oil	0.0919 kg CO_2e/MJ	Market for diesel, burned in building machine (Reference product: diesel, burned in building machine)

TRANSPORT AND INSTALLATION (A4-A5)

TRANSPORTATION A4

This module includes transport from the production gate to the building site / customer. A transport distance of 360 km is assumed because the actual location varies. Default distance is the distance from the manufacturer to the capital of Finland.

INSTALLATION A5

This module includes product installation losses, emissions of energy use in installation and generation of waste at the installation phase.

In our case, there is no loss in the installation stage. It can be assumed that there are no significant environmental impacts caused by energy or water use in installation phase. Thus, in the LCA, this phase only includes the end-of-life of the packaging materials that are discarded after installation. For waste treatment a transport distance of 50 km is assumed because the actual location of disposal is unknown.

From packaging materials are assumed to be incinerated and used as energy beyond the system boundary.

Transportation and installation phase is calculated based on a scenario with the parameters described in the following table (Table 3).

Table 3. Scenario parameters for transportation in stages A4 and A5

Parameter	Value
Fuel type and consumption of vehicle used for transport	Transport, freight, lorry 16-32 metric ton, EURO5 (0.17 kg CO2e / tkm)
Distance (km)	Module A4: • Assumed distance: 360 km Module A5: • Assumed distance: 50 km
Capacity utilization (%)	50 %
Volume capacity utilization factor	1

PRODUCT USE AND MAINTENANCE (B1-B7)

Modules B1-B7 are not declared in this study. Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4)

End of life stage is subdivided into four modules: C1 (Deconstruction, demolition), C2 (Transportation), C3 (Waste processing for reuse, recovery and/or recycling) and C4 (Disposal).

Most common practice is to separate steel products from concrete and recycle them. In this case it is assumed that 95% of steel is recycled and 5% is disposed. For waste treatment, a transport distance of 50 km is assumed as a conservative assumption.

Table 4. Scenario parameters for stages C3 and C4

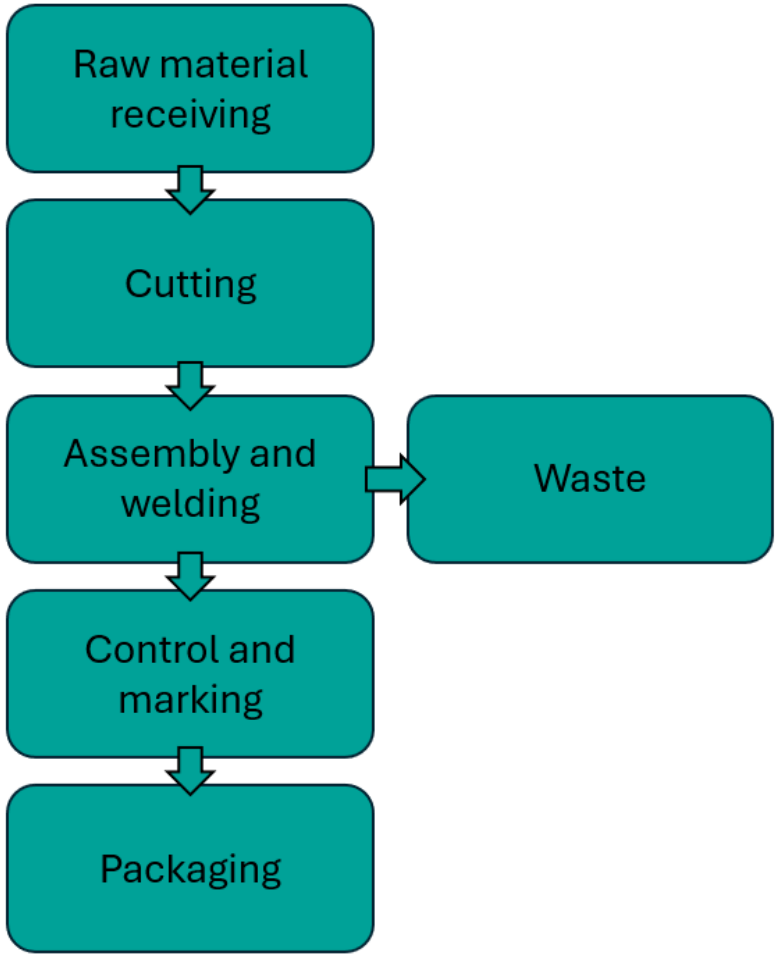
Process		Value (%)	Value (kg)
Collection process	Collected separately	100	0
	Collected with mixed waste	0	0
Recovery process	For reuse	0	0
	For recycling	95	0.95
	For energy recovery	0	0
Disposal	Landfill	5	0.05

BENEFITS AND LOADS BEYONED SYSTEM BOYNDARY (D)

Module D covers the net benefits and loads arising from the reuse of products or the recycling or recovery of energy from end-of-waste state materials.

In this case the product is 100% made from metals, so the benefits from avoided primary metal production due to the recycling of materials end of life was included. Also, benefits and load from packaging materials from stage A5 are considered.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2023

DECLARED AND FUNCTIONAL UNIT

Declared unit	1 kg
Mass per declared unit	1 kg
Functional unit	
Reference service life	same as building

SYSTEM BOUNDARY

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x	x	x
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

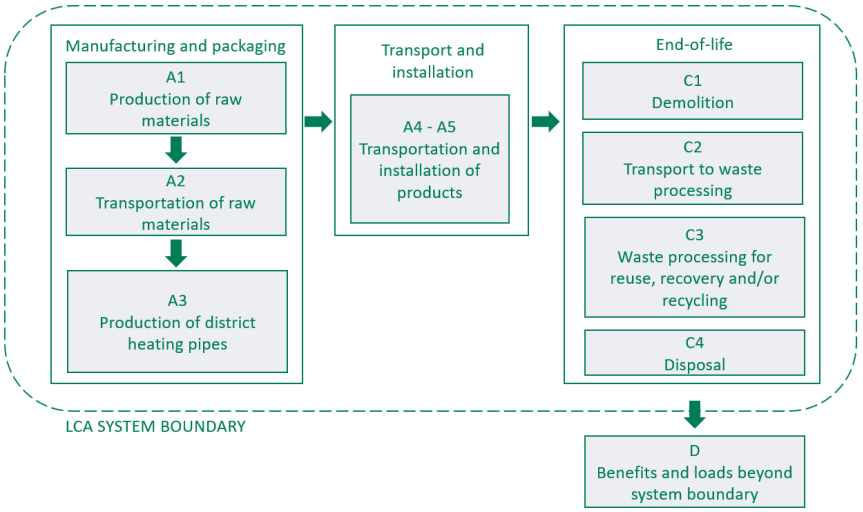


Figure 1. LCA System Boundary

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and the applied PCR. The study does not exclude any hazardous materials or substances.

The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation.

There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation.

In this study, as per EN 15804, allocation is conducted in the following order;

1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small.
3. Allocation should be based on economic values.

The allocations in the ecoinvent 3.10.1 datasets used in this study follow the Ecoinvent system model 'Allocation, cut-off, EN15804'.

Raw material use was known by product level, so allocation was not needed. Avoiding allocation could not be avoided for following inputs as the information was only measured on factory process level:

- Energy consumption
- Manufacturing waste
- Packaging materials
- Welding gases
- The inputs were allocated to studied products based on production volume (mass in kilograms).

AVERAGES AND VARIABILITY

Slab products encompass a range of standard and custom-made products, with orders varying in steel grades and quantities. Due to this variability, a typical order cannot be defined. Therefore, this assessment studies the average material composition for this product group.

The average product consists of 100% raw material steel.

DATA QUALITY ASSESSMENT

All input and output flows of inventory data, type of materials used, energy consumption, transportation and wastes are primary data taken from the Manufacturer. The specific data quality coverages and limitations are also;

- Geographical coverage: European and global environmental data are used for the flows when there is no specific data for the current situation in Finland.
- Time period coverage: Inventory data from year 2023 with 12 consecutive months was collected from manufacturing facility. Generic data from Ecoinvent v3.10.1 is not older than 5 years. Although year 2023 is not the latest full calendar year when conducting the current EPDs, the date of the data is not expected to have a major impact on the reliability of the study results, as the manufacturer has not reported any changes that would significantly affect the product phase calculations or results.
- Technology coverage: The objective of the study is to use the data that apply to average technology which represents the actual situation. Even if the data in Ecoinvent v3.10.1 which represents the current situation best are used, these data are expected to show limited global variability.

The data quality assessment has been conducted on the cradle-to-gate (A1-A3) impacts which are the mandatory stages and represent measured data. The effect of distribution (A4), installation (A5) and end-of-life (C1-C4) have been assessed as these stages are scenario-based and provide additional information. Inventory data of product stage (A1-A3) and the scenarios (A4-A5 and C1-C4) was collected via questionnaire and personal contact with representative of the Manufacturer.

ENVIRONMENTAL IMPACT DATA

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. Note: additional environmental impact data may be presented in annexes.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	4,80E+00	7,06E-02	4,26E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	9,67E-03	2,07E-02	3,12E-04	-1,47E+00
GWP – fossil	kg CO_2e	4,84E+00	7,06E-02	6,43E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	9,67E-03	2,07E-02	3,12E-04	-1,47E+00
GWP – biogenic	kg CO_2e	-4,20E-02	0,00E+00	4,20E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-3,21E-04
GWP – LULUC	kg CO_2e	4,25E-03	2,50E-05	1,97E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,42E-06	1,71E-05	1,78E-07	-2,05E-04
Ozone depletion pot.	kg CFC_{-11}e	5,58E-08	1,40E-09	9,35E-12	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,92E-10	1,39E-10	9,04E-12	-4,86E-09
Acidification potential	mol H^+e	2,55E-02	2,21E-04	4,88E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,02E-05	9,18E-05	2,21E-06	-5,81E-03
EP-freshwater[2)]	kg Pe	1,32E-03	4,69E-06	1,88E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,41E-07	8,12E-06	2,57E-08	-6,29E-04
EP-marine	kg Ne	4,97E-03	7,45E-05	2,44E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,02E-05	4,33E-05	8,44E-07	-1,29E-03
EP-terrestrial	mol Ne	5,30E-02	8,10E-04	2,38E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,11E-04	2,42E-04	9,21E-06	-1,42E-02
POCP ("smog")[3)]	kg NMVOCe	1,72E-02	3,46E-04	6,48E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,74E-05	7,18E-05	3,30E-06	-4,81E-03
ADP-minerals & metals[4)]	kg Sbe	9,52E-05	2,30E-07	1,62E-09	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,16E-08	3,74E-07	4,96E-10	-1,42E-05
ADP-fossil resources	MJ	5,53E+01	9,92E-01	6,97E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,36E-01	1,55E-01	7,66E-03	-1,34E+01
Water use[5)]	m^3e depr.	6,11E+00	4,87E-03	8,48E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,67E-04	4,86E-03	2,21E-05	-2,47E-01

1) *GWP = Global Warming Potential*
2) *EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e*
3) *POCP = Photochemical ozone formation*
4) *ADP = Abiotic depletion potential*
5) *EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.*

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	1,12E+01	1,71E-02	-4,37E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,35E-03	2,93E-02	7,39E-05	-9,45E-01
Renew. PER as material	MJ	3,50E-01	0,00E+00	-3,50E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	1,15E+01	1,71E-02	-7,87E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,35E-03	2,93E-02	7,39E-05	-9,45E-01
Non-re. PER as energy	MJ	5,57E+01	9,92E-01	7,05E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,36E-01	1,55E-01	7,66E-03	-1,34E+01
Non-re. PER as material	MJ	1,54E-02	0,00E+00	-1,54E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	5,57E+01	9,92E-01	-8,30E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,36E-01	1,55E-01	7,66E-03	-1,34E+01
Secondary materials	kg	6,56E-01	4,54E-04	9,92E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,22E-05	2,96E-04	1,93E-06	8,09E-01
Renew. secondary fuels	MJ	8,93E-03	5,73E-06	3,99E-08	MND	MND	MND	MND	MND	MND	MND	0,00E+00	7,85E-07	2,30E-05	3,99E-08	-1,21E-04
Non-ren. secondary fuels	MJ	6,70E-02	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	1,25E-01	1,34E-04	5,65E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,83E-05	7,87E-05	7,97E-06	-3,29E-03

6) PER = Primary energy resources

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	3,75E+00	1,43E-03	1,72E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,95E-04	2,19E-03	8,46E-06	-4,85E-01
Non-hazardous waste	kg	8,28E+00	3,01E-02	2,66E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,11E-03	1,24E-01	1,93E-04	-3,77E+00
Radioactive waste	kg	1,06E-04	3,13E-07	2,12E-09	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,30E-08	5,69E-07	1,17E-09	1,34E-05

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	1,83E-04	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	1,86E-02	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	9,50E-01	0,00E+00	0,00E+00
Materials for energy rec	kg	1,13E-02	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	2,64E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

KEY INFORMATION TABLE (RTS) – KEY INFORMATION PER KG OF PRODUCT

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total	kg CO_2e	4,80E+00	7,07E-02	4,26E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	9,67E-03	2,07E-02	3,12E-04	-1,47E+00
ADP-minerals & metals	kg Sbe	9,51E-05	2,31E-07	1,64E-09	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,16E-08	3,74E-07	4,96E-10	-1,42E-05
ADP-fossil	MJ	5,53E+01	9,92E-01	7,05E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,36E-01	1,55E-01	7,66E-03	-1,34E+01
Water use	m^3e depr.	6,11E+00	4,87E-03	8,58E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,67E-04	4,86E-03	2,21E-05	-2,47E-01
Secondary materials	kg	6,56E-01	4,54E-04	9,92E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,22E-05	2,96E-04	1,93E-06	8,09E-01
Biog. C in product[9)]	kg C	0,00E+00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Biog. C in packaging	kg C	1,16E-02	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

7) Biog. C in product = Biogenic carbon content in product

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Electricity, Finland, residual mix (One Click LCA)
Electricity kg CO_2e / kWh	0.68

Transport scenario documentation (A4)

Scenario parameter	Value
Specific transport CO_2e emissions, kg CO_2e / tkm	0.17
Average transport distance, km	360
Capacity utilization (including empty return) %	50% (full to the site, empty return)
Bulk density of transported products	7850 kg/m^3
Volume capacity utilization factor	1

End of life scenario documentation

Scenario parameter	Value
Collection process – kg collected separately	1
Collection process – kg collected with mixed waste	-
Recovery process – kg for re-use	-
Recovery process – kg for recycling	0.95
Recovery process – kg for energy recovery	-
Disposal (total) – kg for final deposition	0.05
Scenario assumptions e.g. transportation	50 km

BIBLIOGRAPHY

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ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

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EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

Building Information Foundations RTS SR PCR version 260820

Semko steel products' background report 18 August 2025