



ENVIRONMENTAL PRODUCT DECLARATION

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

Connecting parts for concrete

Fastening plates, corner protectors, and standard steel components



Programme operator: The Building Information Foundation RTS sr, Rakennustietosäätiö RTS sr, Malminkatu 16 A, 00100 Helsinki, Finland <https://cer.rts.fi/>

EPD registration number: RTS_408_25

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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.

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com. The manufacturer has the sole ownership, liability, and responsibility for the EPD.

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	The Building Information Foundation RTS sr
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, the RTS PCR is used.
EPD author	Kasper Karjalainen kasper.karjalainen@ains.fi Alasintie 10, 90400 Oulu A-Insinöörit Suunnittelu Oy www.ains.fi 
EPD verification	Independent verification of this EPD and data, according to ISO 14025: <input type="checkbox"/> Internal verification <input checked="" type="checkbox"/> External verification
Verification date	1.10.2024
EPD verifier	Sigita Židonienė Vesta Consulting UAB 
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EPD valid until	18.8.2030

PRODUCT INFORMATION

PRODUCT IDENTIFICATION

Product name	Fastening Plates, Corner Protectors and Standard Steel Components
Additional labels	FASTENING PLATES: SBKL, KL, LTT, JKL; CORNER PROTECTORS: KTU, KTS, KTT, SU 1800 AND RT/SU STANDARD STEEL COMPONENTS
Product number / reference	-
Place of production	Finland
CPC code	-

PRODUCT DESCRIPTION AND APPLICATION

This EPD represents connecting parts produced at Semko facility in Seinäjoki, Finland. Connecting parts include a wide range of components used in precast and cast-in-situ concrete connections. These components include SBKL, KL, LTT, JKL, KTU, KTS, KTT, and SU 1800 and they are made from steel or stainless steel. Generally, they are used to connect different building components such as foundations, columns, beams, slabs, walls, floors, and balconies.

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) is presented in Tables 1 and 2.

Table 1. Steel product main composition

Raw material category	Weight (%)	Usability			Biogenic material weight kg C ⁽²⁾	Material origin
		Renewable (%)	Non-renewable (%)	Post-consumer (%) ⁽¹⁾		
Steel	100	0	100	8.4	0.00	Europe ⁽³⁾
Packaging materials	Weight (%)	Weight-% (vs the product)				
Wood	100	2.6			0.0116	Europe

1) Post-consumer material is based on the EPDs of the raw material used

2) 1 kg biogenic carbon is equivalent to 44/12 kg CO₂

3) 21.0 % of total steel materials comes from India and South Africa

Table 2. Stainless steel product main composition

Raw material category	Weight (%)	Usability			Biogenic material weight kg C ⁽²⁾	Material origin
		Renewable (%)	Non-renewable (%)	Post-consumer (%) ⁽¹⁾		
Steel	100	0	100	31.9	0.00	Europe ⁽³⁾
Packaging materials	Weight (%)	Weight-% (vs the product)				
Wood	100	2.6			0.0116	Europe

1) Post-consumer material is based on the EPDs of the raw material used

2) 1 kg biogenic carbon is equivalent to 44/12 kg CO₂

3) 4.4 % of total stainless steel materials comes from South Korea

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

MANUFACTURING AND PACKAGING (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 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 3. Parameters for manufacturing energy use (stage A3)

Energy type	GWP-value	Data quality
Electricity	0.68 kg CO ₂ e/kWh	Electricity, Finland, residual mix (One Click LCA)
District heating	Not applicable	Not applicable

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: <ul style="list-style-type: none"> Assumed distance: 360 km Module A5: <ul style="list-style-type: none"> Assumed distance: 50 km Module C2: <ul style="list-style-type: none"> Assumed distance: 50 km
Capacity utilization (%)	100 %
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.

Table 4. Scenario parameters for stages C3 and C4

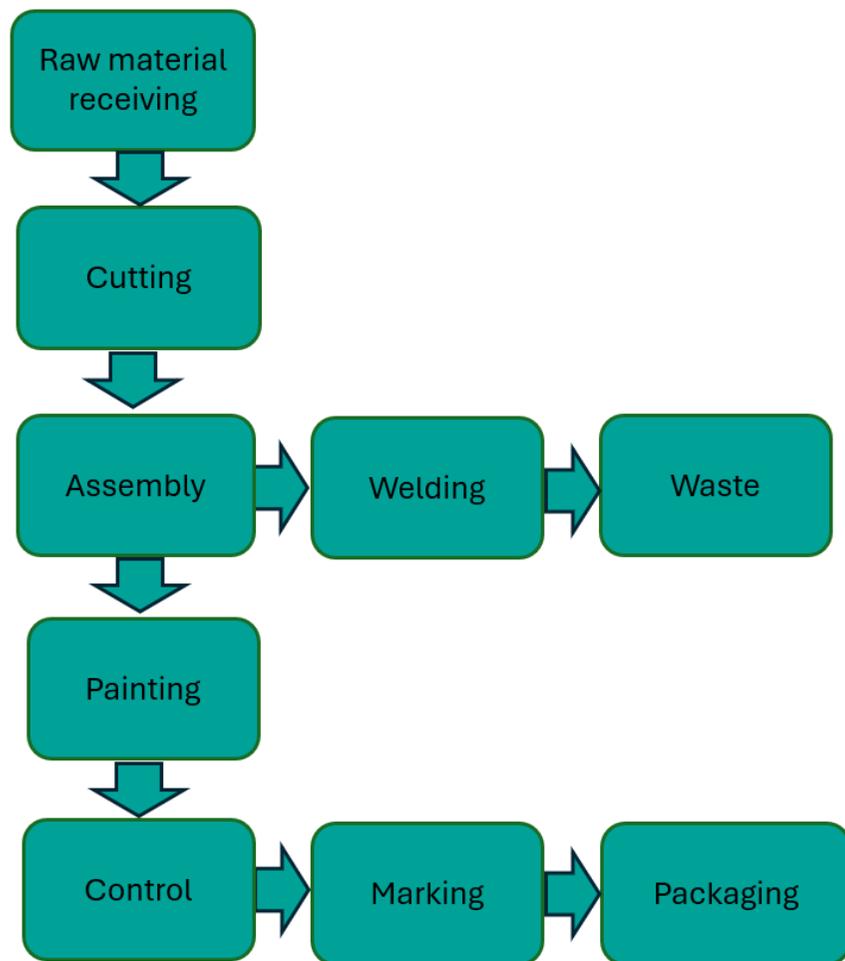
Process		Value (%)	Value (kg)
Collection process	Collected separately	100	0
	Collected with mixed waste	0	0
Recovery process	For reuse	0	0
	For recycling	95	0.95
	For energy recovery	0	0
Disposal	Landfill	5	0.05

BENEFITS AND LOADS BEYOND 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 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
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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.

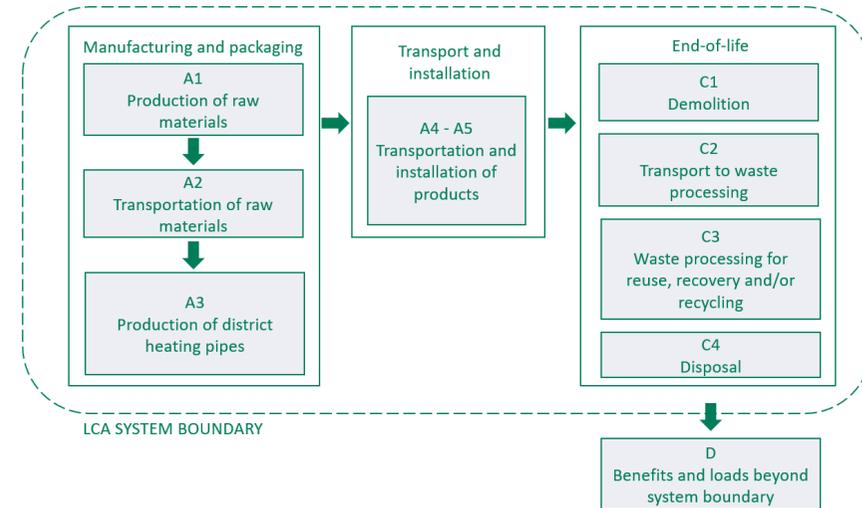


Figure 1. LCA System Boundary

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 3.8 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

Connecting parts encompass a range of standard and custom-made products, with orders varying in steel grades and quantities. This means that some products may contain more steel plates and less rebar, or vice versa, and varying amounts of wire. Due to this variability, a typical order cannot be defined. Therefore, this assessment studies the average material composition for this product group.

The average material composition for steel products is 77.6% plates and flat steel products, 21.2% rebar, and 1.2% wire and paints. For stainless steel products, the composition is 94.3% plates, 4.6% rebar, and 1.0% wire.

ENVIRONMENTAL IMPACT DATA FOR STEEL PRODUCTS

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 ₂ e	2,03E+00	6,14E-02	4,24E-02	MND	0,00E+00	8,31E-03	2,12E-02	2,64E-04	-1,42E+00						
GWP – fossil	kg CO ₂ e	2,07E+00	6,14E-02	6,10E-04	MND	0,00E+00	8,31E-03	2,12E-02	2,63E-04	-1,42E+00						
GWP – biogenic	kg CO ₂ e	-4,18E-02	0,00E+00	4,18E-02	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,86E-04						
GWP – LULUC	kg CO ₂ e	1,70E-03	2,41E-05	2,13E-07	MND	0,00E+00	3,26E-06	1,76E-05	2,49E-07	-2,51E-04						
Ozone depletion pot.	kg CFC ₁₁ e	1,29E-07	1,42E-08	7,71E-11	MND	0,00E+00	1,92E-09	9,73E-10	1,07E-10	-5,54E-08						
Acidification potential	mol H ⁺ e	2,76E-02	2,49E-04	5,10E-06	MND	0,00E+00	3,37E-05	9,78E-05	2,48E-06	-5,86E-03						
EP-freshwater ²⁾	kg Pe	5,38E-05	4,31E-07	6,87E-09	MND	0,00E+00	5,83E-08	8,35E-07	2,76E-09	-5,83E-05						
EP-marine	kg Ne	1,14E-02	7,44E-05	2,26E-06	MND	0,00E+00	1,01E-05	3,74E-05	8,57E-07	-1,19E-03						
EP-terrestrial	mol Ne	8,87E-02	8,20E-04	2,42E-05	MND	0,00E+00	1,11E-04	2,48E-04	9,43E-06	-1,39E-02						
POCP (“smog”) ³⁾	kg NMVOCe	3,22E-02	2,51E-04	6,13E-06	MND	0,00E+00	3,40E-05	6,99E-05	2,74E-06	-7,04E-03						
ADP-minerals & metals ⁴⁾	kg Sbe	1,10E-05	2,18E-07	1,84E-09	MND	0,00E+00	2,94E-08	6,63E-07	6,05E-10	-2,68E-05						
ADP-fossil resources	MJ	2,34E+01	9,11E-01	6,57E-03	MND	0,00E+00	1,23E-01	1,58E-01	7,22E-03	-1,24E+01						
Water use ⁵⁾	m ³ e depr.	1,09E+00	4,21E-03	1,74E-03	MND	0,00E+00	5,70E-04	5,13E-03	2,29E-05	-2,56E-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.

ADDITIONAL (OPTIONAL) 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
Particulate matter	Incidence	9,01E-08	5,30E-09	6,37E-11	MND	0,00E+00	7,17E-10	1,64E-09	4,99E-11	-9,43E-08						
Ionizing radiation ⁶⁾	kBq U235e	1,08E-01	4,77E-03	2,40E-05	MND	0,00E+00	6,46E-04	2,53E-03	3,27E-05	4,61E-02						
Ecotoxicity (freshwater)	CTUe	2,82E+01	7,56E-01	8,89E-03	MND	0,00E+00	1,02E-01	2,82E+00	4,71E-03	-5,05E+01						
Human toxicity, cancer	CTUh	5,87E-09	2,34E-11	1,20E-12	MND	0,00E+00	3,17E-12	4,44E-11	1,18E-13	1,19E-08						
Human tox. non-cancer	CTUh	3,24E-08	7,68E-10	5,67E-11	MND	0,00E+00	1,04E-10	7,05E-10	3,08E-12	-3,37E-08						
SQP ⁷⁾	-	9,65E+00	6,38E-01	3,32E-03	MND	0,00E+00	8,64E-02	8,08E-01	1,54E-02	-4,54E+00						

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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

7) SQP = Land use related impacts/soil quality.

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	2,14E+00	1,31E-02	1,28E-04	MND	0,00E+00	1,77E-03	2,56E-02	6,27E-05	-1,07E+00						
Renew. PER as material	MJ	3,49E-01	0,00E+00	-3,49E-01	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00						
Total use of renew. PER	MJ	2,49E+00	1,31E-02	-3,49E-01	MND	0,00E+00	1,77E-03	2,56E-02	6,27E-05	-1,07E+00						
Non-re. PER as energy	MJ	2,34E+01	9,11E-01	6,57E-03	MND	0,00E+00	1,23E-01	1,57E-01	7,22E-03	-1,24E+01						
Non-re. PER as material	MJ	1,53E-02	0,00E+00	-1,53E-02	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00						
Total use of non-re. PER	MJ	2,34E+01	9,11E-01	-8,73E-03	MND	0,00E+00	1,23E-01	1,57E-01	7,22E-03	-1,24E+01						
Secondary materials	kg	3,43E-01	3,05E-04	9,17E-06	MND	0,00E+00	4,14E-05	2,84E-04	1,52E-06	8,66E-01						
Renew. secondary fuels	MJ	7,90E-03	3,37E-06	3,08E-08	MND	0,00E+00	4,56E-07	2,30E-05	3,96E-08	-1,29E-04						
Non-ren. secondary fuels	MJ	4,94E-02	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00						
Use of net fresh water	m ³	2,69E-02	1,15E-04	-5,05E-06	MND	0,00E+00	1,55E-05	1,33E-04	7,90E-06	-3,11E-03						

8) 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	2,92E-01	1,02E-03	3,57E-06	MND	0,00E+00	1,38E-04	2,06E-03	0,00E+00	-4,69E-01						
Non-hazardous waste	kg	1,76E+00	1,82E-02	2,59E-02	MND	0,00E+00	2,46E-03	6,59E-02	5,00E-02	-2,35E+00						
Radioactive waste	kg	1,56E-04	6,28E-06	2,19E-08	MND	0,00E+00	8,50E-07	9,21E-07	0,00E+00	2,75E-06						

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	2,52E-06	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00						
Materials for recycling	kg	4,98E-02	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	9,50E-01	0,00E+00	0,00E+00						
Materials for energy rec	kg	2,80E-03	0,00E+00	0,00E+00	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	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 ₂ e	2,03E+00	6,14E-02	4,24E-02	MND	0,00E+00	8,32E-03	1,09E-02	2,64E-04	-1,42E+00						
ADP-minerals & metals	kg Sbe	1,10E-05	2,18E-07	1,84E-09	MND	0,00E+00	2,88E-08	6,60E-07	5,96E-10	-2,67E-05						
ADP-fossil	MJ	2,34E+01	9,11E-01	6,57E-03	MND	0,00E+00	1,23E-01	1,58E-01	7,22E-03	-1,24E+01						
Water use	m ³ e depr.	1,09E+00	4,21E-03	1,74E-03	MND	0,00E+00	5,70E-04	5,13E-03	2,29E-05	-2,56E-01						
Secondary materials	kg	3,43E-01	3,05E-04	9,17E-06	MND	0,00E+00	4,14E-05	2,84E-04	1,52E-06	8,66E-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

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

ENVIRONMENTAL IMPACT DATA FOR STAINLESS STEEL PRODUCTS

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.

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 ₂ e	4,06E+00	6,14E-02	4,24E-02	MND	0,00E+00	8,31E-03	2,12E-02	2,64E-04	-5,86E-01						
GWP – fossil	kg CO ₂ e	4,10E+00	6,14E-02	6,10E-04	MND	0,00E+00	8,31E-03	2,12E-02	2,63E-04	-5,87E-01						
GWP – biogenic	kg CO ₂ e	-4,18E-02	0,00E+00	4,18E-02	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,35E-04						
GWP – LULUC	kg CO ₂ e	7,19E-03	2,41E-05	2,13E-07	MND	0,00E+00	3,26E-06	1,76E-05	2,49E-07	5,11E-04						
Ozone depletion pot.	kg CFC-11e	1,75E-07	1,42E-08	7,71E-11	MND	0,00E+00	1,92E-09	9,73E-10	1,07E-10	-1,62E-08						
Acidification potential	mol H ⁺ e	3,10E-02	2,49E-04	5,10E-06	MND	0,00E+00	3,37E-05	9,78E-05	2,48E-06	-2,25E-03						
EP-freshwater ²⁾	kg Pe	7,86E-05	4,31E-07	6,87E-09	MND	0,00E+00	5,83E-08	8,35E-07	2,76E-09	-5,05E-06						
EP-marine	kg Ne	5,05E-03	7,44E-05	2,26E-06	MND	0,00E+00	1,01E-05	3,74E-05	8,57E-07	-1,11E-05						
EP-terrestrial	mol Ne	5,59E-02	8,20E-04	2,42E-05	MND	0,00E+00	1,11E-04	2,48E-04	9,43E-06	-6,05E-03						
POCP (“smog”) ³⁾	kg NMVOCe	1,64E-02	2,51E-04	6,13E-06	MND	0,00E+00	3,40E-05	6,99E-05	2,74E-06	-3,33E-03						
ADP-minerals & metals ⁴⁾	kg Sbe	1,71E-04	2,18E-07	1,84E-09	MND	0,00E+00	2,94E-08	6,63E-07	6,05E-10	-1,82E-05						
ADP-fossil resources	MJ	5,25E+01	9,11E-01	6,57E-03	MND	0,00E+00	1,23E-01	1,58E-01	7,22E-03	-4,89E+00						
Water use ⁵⁾	m ³ e depr.	5,29E+01	4,21E-03	1,74E-03	MND	0,00E+00	5,70E-04	5,13E-03	2,29E-05	2,31E-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.

ADDITIONAL (OPTIONAL) 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
Particulate matter	Incidence	5,46E-01	5,30E-09	6,37E-11	MND	0,00E+00	7,17E-10	1,64E-09	4,99E-11	-2,00E-08						
Ionizing radiation ⁶⁾	kBq U235e	1,84E-01	4,77E-03	2,40E-05	MND	0,00E+00	6,46E-04	2,53E-03	3,27E-05	6,30E-03						
Ecotoxicity (freshwater)	CTUe	4,25E+01	7,56E-01	8,89E-03	MND	0,00E+00	1,02E-01	2,82E+00	4,71E-03	-1,37E+01						
Human toxicity, cancer	CTUh	2,72E-08	2,34E-11	1,20E-12	MND	0,00E+00	3,17E-12	4,44E-11	1,18E-13	6,02E-09						
Human tox. non-cancer	CTUh	4,94E-03	7,68E-10	5,67E-11	MND	0,00E+00	1,04E-10	7,05E-10	3,08E-12	3,59E-08						
SQP ⁷⁾	-	1,31E+01	6,38E-01	3,32E-03	MND	0,00E+00	8,64E-02	8,08E-01	1,54E-02	-2,17E+00						

6) EN 15804+A2 disclaimer for ionizing radiation, human health. 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

7) SQP = Land use related impacts/soil quality.

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	9,20E+00	1,31E-02	1,28E-04	MND	0,00E+00	1,77E-03	2,56E-02	6,27E-05	-7,56E-01						
Renew. PER as material	MJ	3,49E-01	0,00E+00	-3,49E-01	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00						
Total use of renew. PER	MJ	9,54E+00	1,31E-02	-3,49E-01	MND	0,00E+00	1,77E-03	2,56E-02	6,27E-05	-7,56E-01						
Non-re. PER as energy	MJ	5,52E+01	9,11E-01	6,57E-03	MND	0,00E+00	1,23E-01	1,57E-01	7,22E-03	-4,89E+00						
Non-re. PER as material	MJ	1,53E-02	0,00E+00	-1,53E-02	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00						
Total use of non-re. PER	MJ	5,52E+01	9,11E-01	-8,73E-03	MND	0,00E+00	1,23E-01	1,57E-01	7,22E-03	-4,89E+00						
Secondary materials	kg	4,10E-01	3,05E-04	9,17E-06	MND	0,00E+00	4,14E-05	2,84E-04	1,52E-06	6,31E-01						
Renew. secondary fuels	MJ	8,16E-03	3,37E-06	3,08E-08	MND	0,00E+00	4,56E-07	2,30E-05	3,96E-08	-8,03E-05						
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00						
Use of net fresh water	m ³	1,36E+00	1,15E-04	-5,05E-06	MND	0,00E+00	1,55E-05	1,33E-04	7,90E-06	-1,65E-02						

8) 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	1,19E+00	1,02E-03	3,57E-06	MND	0,00E+00	1,38E-04	2,06E-03	0,00E+00	-3,61E-01						
Non-hazardous waste	kg	2,75E+00	1,82E-02	2,59E-02	MND	0,00E+00	2,46E-03	6,59E-02	5,00E-02	-1,22E+00						
Radioactive waste	kg	9,40E-04	6,28E-06	2,19E-08	MND	0,00E+00	8,50E-07	9,21E-07	0,00E+00	3,94E-07						

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	3,07E-03	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00						
Materials for recycling	kg	1,79E-02	0,00E+00	0,00E+00	MND	0,00E+00	0,00E+00	9,50E-01	0,00E+00	0,00E+00						
Materials for energy rec	kg	1,57E-02	0,00E+00	0,00E+00	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	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 ₂ e	4,06E+00	6,14E-02	4,24E-02	MND	0,00E+00	8,31E-03	2,12E-02	2,64E-04	-5,86E-01						
ADP-minerals & metals	kg Sbe	1,71E-04	2,18E-07	1,84E-09	MND	0,00E+00	2,94E-08	6,63E-07	6,05E-10	-1,82E-05						
ADP-fossil	MJ	5,25E+01	9,11E-01	6,57E-03	MND	0,00E+00	1,23E-01	1,58E-01	7,22E-03	-4,89E+00						
Water use	m ³ e depr.	5,29E+01	4,21E-03	1,74E-03	MND	0,00E+00	5,70E-04	5,13E-03	2,29E-05	2,31E-01						
Secondary materials	kg	4,10E-01	3,05E-04	9,17E-06	MND	0,00E+00	4,14E-05	2,84E-04	1,52E-06	6,31E-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

9) 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	-

Scenario parameter	Value
Disposal (total) – kg for final deposition	0
Scenario assumptions e.g. transportation	0.05

BIBLIOGRAPHY

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations. Principles and procedures.

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

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

Ecoinvent database v3.8 (2021) and One Click LCA database.

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

Semko steel and stainless-steel background report



VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with EN 15804, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The background report (project report) for this EPD

Why does verification transparency matter? [Read more online.](#)

VERIFICATION OVERVIEW

Following independent third party has verified this specific EPD:

EPD verification information	Answer
Independent EPD verifier	Sigita Židonienė
EPD verification started on	9.9.2024
EPD verification completed on	1.10.2024
Approver of the EPD verifier	The Building Information Foundation

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of

- the data collected and used in the LCA calculations,
- the way the LCA-based calculations have been carried out,
- the presentation of environmental data in the EPD, and
- other additional environmental information, as present

with respect to the procedural and methodological requirements in ISO 14025:2010 and EN 15804:2012+A2:2019.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

THIRD-PARTY VERIFICATION STATEMENT

ANNEX 1: ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Results for steel products

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO ₂ e	1,15E+00	6,08E-02	5,89E-04	MND	0,00E+00	8,23E-03	3,41E-02	2,58E-04	-1,34E+00						
Ozone depletion Pot.	kg CFC ₁₁ e	7,17E-08	1,13E-08	6,30E-11	MND	0,00E+00	1,52E-09	8,11E-10	8,43E-11	-6,16E-08						
Acidification	kg SO ₂ e	4,04E-03	1,93E-04	3,64E-06	MND	0,00E+00	2,62E-05	7,75E-05	1,87E-06	-4,75E-03						
Eutrophication	kg PO ₄ ³ e	1,29E-03	4,39E-05	3,57E-06	MND	0,00E+00	5,95E-06	1,29E-04	4,03E-07	-2,40E-03						
POCP ("smog")	kg C ₂ H ₄ e	3,41E-04	7,93E-06	1,25E-07	MND	0,00E+00	1,07E-06	7,69E-06	7,84E-08	-8,04E-04						
ADP-elements	kg Sbe	4,84E-06	2,13E-07	1,70E-09	MND	0,00E+00	2,88E-08	6,60E-07	5,96E-10	-2,67E-05						
ADP-fossil	MJ	1,37E+01	9,11E-01	6,57E-03	MND	0,00E+00	1,23E-01	1,57E-01	7,22E-03	-1,24E+01						

Results for stainless-steel products

Impact category	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO ₂ e	1,31E+00	6,08E-02	5,89E-04	MND	0,00E+00	8,23E-03	3,41E-02	2,58E-04	-5,44E-01						
Ozone depletion Pot.	kg CFC ₁₁ e	7,89E-08	1,13E-08	6,30E-11	MND	0,00E+00	1,52E-09	8,11E-10	8,43E-11	-2,36E-08						
Acidification	kg SO ₂ e	7,54E-03	1,93E-04	3,64E-06	MND	0,00E+00	2,62E-05	7,75E-05	1,87E-06	-1,79E-03						
Eutrophication	kg PO ₄ ³ e	1,55E-03	4,39E-05	3,57E-06	MND	0,00E+00	5,95E-06	1,29E-04	4,03E-07	-9,26E-04						
POCP ("smog")	kg C ₂ H ₄ e	3,30E-04	7,93E-06	1,25E-07	MND	0,00E+00	1,07E-06	7,69E-06	7,84E-08	-4,38E-04						
ADP-elements	kg Sbe	3,91E-05	2,13E-07	1,70E-09	MND	0,00E+00	2,88E-08	6,60E-07	5,96E-10	-1,81E-05						
ADP-fossil	MJ	1,77E+01	9,11E-01	6,57E-03	MND	0,00E+00	1,23E-01	1,57E-01	7,22E-03	-4,89E+00						