

Environmental Product Declaration

In accordance with ISO 14025 and EN 15804 +A1



SMITH STÅL

The Norwegian
EPD Foundation

Owner of the declaration:
E. A. Smith AS

Program holder and publisher:
The Norwegian EPD foundation

Declaration number:
NEPD-3338-1975-EN

Registration Number:
NEPD-3338-1975-EN

Issue date: 04.04.2022
Valid to: 04.04.2027

Product name:

Cold formed hollow
structural sections

Manufacturer:
E. A. Smith AS

General information

Product:

Cold formed hollow structural sections

Program Operator:

The Norwegian EPD Foudation
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Declaration Number:

NEPD-3338-1975-EN

This declaration is based on Product Category Rules:

CEN Standard EN 15804 serves as core PCR. NPCR Part A: Construction products and services

Statements:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer, life cycle assessment data and evidences.

Declared unit:

1 metric tonne of cold formed hollow structural section delivered to customer from Smith Stål's facilities

Declared unit with option:

N/A

Functional unit:

N/A

Verification:

Independent verification of the declaration and data, according to ISO14025:2010

internal

external



Charlotte Merlin, FORCE Technology

Independent verifier approved by EPD Norway

Owner of the declaration:

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Manufacturer:

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Place of production:

Bergen, Harstad, Holmestrand, Horten, Kristiansund, Tromsø, Trondheim and Ålesund

Management system:

Miljøfyrtårn / Eco-Lighthouse

Smith Stål Vest, Bergen and *Smith Stål Nord*, *Trondheim* are certified acc. ISO 9001:2015 and ISO 14001:2015

Organisation no:

816051142

Issue date:

04.04.2022

Valid to:

04.04.2027

Year of study:

2021

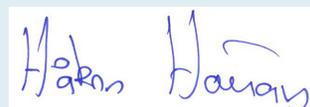
Comparability:

EPDs from other programmes than The Norwegian EPD Foundation may not be comparable.

RAMBOLL

The EPD has been worked out by:

Niclas Silfverstrand, Yevgeniya Arushanyan, David Althoff Palm



Approved, Manager of The Norwegian EPD Foundation

Product

Product description:

Hollow structural sections are a type of steel section with a hollow center that can be used for construction. Hollow sections come in several different shapes and can have a round, rectangular or square cross section. Smith Stål is offering cold formed hollow structural sections of square and rectangular shape with steel quality S355J2H. Thickness of the sections varies between 3 and 8 mm, the weight varies between 2 and 22 kg/m. A full list of cold formed hollow structural section qualities and dimensions can be found in Smith Stål's product catalogue (<https://magasin.byggern.no/staal/lagerkatalog/>). Cold formed hollow structural sections are formed at ambient temperatures. Specific data is one year average for 2020.

Product specification:

The product is composed of 100% steel

Materials	KG	%
Steel with alloys	1000	100

Technical data:

Quality acc. NS-EN 10219-1

Tolerances acc. NS-EN 10219-1/2

3.1 certificate acc. NS-EN 10204

Certified acc. 1090-2 with product certificate Nr. 1071-CPR-3019

Market:

Norway

Reference service life, product:

Not applicable for a cradle-to-gate with options, A1-A4, assessment.

Reference service life, building:

Not applicable for a cradle-to-gate with options, A1-A4, assessment.

LCA: Calculation rules

Declared unit:

1 metric tonne of cold formed hollow structural section delivered to customer from Smith Stål's facilities

Data quality:

The data quality requirements are set in accordance with EN15804:2012+A1:2013. Specific data for the facilities included in the assessment were collected from Smith Stål. Generic background data has been collected from the GaBi Professional database 2021 and Ecoinvent v3.6. No dataset is more than 10 years old.

System boundary:

System boundaries are shown in Figure 1. Waste flows are treated within the module they occur.

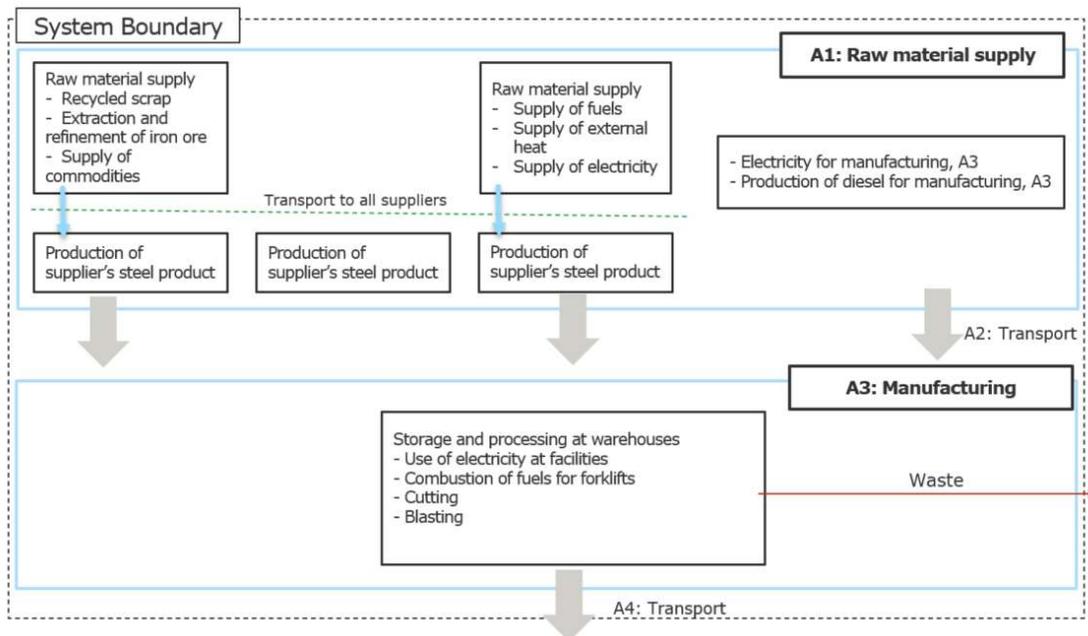


Figure 1: technical flowchart over the system and system boundaries

Allocation:

Allocation is made in accordance with the provisions of EN 15804. Incoming energy and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials allocated to the main product in which the material was used. The transportation of the material is allocated to this analysis.

Cut-off criteria:

All major raw materials and all the essential energy is included. Production processes for raw materials and energy flows that are included in small amounts (<1%) may not be included. The cut-off rule does not apply for hazardous materials and substances.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Transport from production place to user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance KM	Fuel/Energy consumption	value (l/t)
Truck	61	Euro 6 diesel truck	80	0.021 kg diesel/tonkm	1.97

The transport distance in A4 is representative of the transport from Smith Stål to customers. The distance is based on measured transport distances provided by Smith Stål.

LCA: Results

LCA calculations are based on data collected during the study period that represent an average tonne (mass-weighted) steel section sent to customer from the facilities in Bergen, Harstad, Holmestrand, Horten, Kristiansund, Tromsø, Trondheim and Ålesund to customers. Horten is used exclusively for storage and reloading.

System boundaries (X=included, MND= module not declared, MNR=module not relevant)

Product stage			Assembly stage		Use stage								End of life stage				Etter endt levetid
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
X	X	X	X	MND	MND	MND	MND	MND	MND	MNR	MNR	MND	MND	MND	MND	MND	

Environmental impact

Parameter	Unit	A1	A2	A3	A1-A3	A4
GWP	kg CO2 -eq.	2,45E+03	6,51E+01	5,39E+00	2,52E+03	6,01E+00
ODP	kg CFC11-eq.	1,72E-06	2,35E-14	5,54E-09	1,73E-06	1,61E-15
POCP	kg C2H4 -eq.	5,30E+00	2,82E-01	3,24E-03	5,59E+00	4,86E-03
AP	kg SO2 -eq.	4,75E-01	6,12E-02	7,70E-04	5,37E-01	9,61E-04
EP	kg PO43--eq.	8,65E-01	-2,76E-02	3,06E-04	8,38E-01	-9,56E-05
ADPM	kg Sb-eq.	3,74E-03	5,33E-06	-1,26E-07	3,75E-03	5,43E-07
ADPE	MJ	2,36E+04	8,61E+02	2,12E+00	2,45E+04	8,07E+01

GWP Global warming potential; ODP Depletion potential of the stratospheric ozone layer; POCP Formation potential of tropospheric photochemical oxidants; AP Acidification potential of land and water; EP Eutrophication potential; ADPM Abiotic depletion potential for non fossil resources; ADPE Abiotic depletion potential for fossil resources

Resource use

Parameter	Unit	A1	A2	A3	A1-A3	A4
RPEE	MJ	8,01E+02	4,50E+01	1,64E-01	8,46E+02	4,69E+00
RPEM	MJ	2,01E-01	0,00E+00	0,00E+00	2,01E-01	0,00E+00
TPE	MJ	8,01E+02	4,50E+01	1,64E-01	8,46E+02	4,69E+00
NRPE	MJ	2,30E+04	8,73E+02	2,41E+00	2,39E+04	8,18E+01
NRPM	MJ	4,27E+00	0,00E+00	0,00E+00	4,27E+00	0,00E+00
TRPE	MJ	2,30E+04	8,73E+02	2,41E+00	2,39E+04	8,18E+01
SM	kg	1,67E+02	0,00E+00	0,00E+00	1,67E+02	0,00E+00
RSF	MJ	1,51E-03	0,00E+00	0,00E+00	1,51E-03	0,00E+00
NRSF	MJ	1,45E-02	0,00E+00	0,00E+00	1,45E-02	0,00E+00
W	m ³	8,45E+00	5,15E-02	1,15E-02	8,51E+00	5,37E-03

RPEE Renewable primary energy resources used as energy carrier; RPEM Renewable primary energy resources used as raw materials; TPE Total use of renewable primary energy resources; NRPE Non renewable primary energy resources used as energy carrier; NRPM Non renewable primary energy resources used as materials; TRPE Total use of non renewable primary energy resources; SM Use of secondary materials; RSF Use of renewable secondary fuels; NRSF Use of non renewable secondary fuels; W Use of net fresh water

End of life - Waste

Parameter	Unit	A1	A2	A3	A1-A3	A4
HW	KG	9,25E+00	4,13E-08	1,32E-10	9,25E+00	4,31E-09
NHW	KG	9,68E+01	1,32E-01	1,35E-01	9,71E+01	1,28E-02
RW	KG	6,15E+00	2,10E-03	9,05E-05	6,15E+00	1,48E-04

HW Hazardous waste disposed; NHW Non hazardous waste disposed; RW Radioactive waste disposed

End of life – output flow

Parameter	Unit	A1	A2	A3	A1-A3	A4
CR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	MJ	4,56E+00	0,00E+00	4,84E+00	9,40E+00	0,00E+00
ETE	MJ	0,00E+00	0,00E+00	1,40E+01	1,40E+01	0,00E+00

CR Components for reuse; MR Materials for recycling; MER Materials for energy recovery; EEE Exported electric energy; ETE Exported thermal energy

Reading example: 9,0 E-03 = $9,0 \cdot 10^{-3} = 0,009$

Additional Norwegian requirements

Greenhouse gas emission from the use of electricity in the manufacturing phase

The electricity mix used in the manufacturing process (A3) is the Norwegian production mix, transformed to low voltage (production of transmission lines, in addition to direct emissions and losses in grid). Electricity was modelled with data from GaBi Professional 2021 edition, as the Norwegian mix with an emission factor of $3 \cdot 10^{-2}$ kg CO₂-eqv/kWh

Dangerous substances

The product contains no substances given by the REACH Candidate list or the Norwegian priority list

Indoor environment

No tests have been carried out on the product concerning indoor climate - Not relevant.

Carbon footprint

Carbon footprint has not been worked out for the product.

Bibliography

ISO 14025:2010	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and guidelines
EN 15804:2012+A1:2013	Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products
ISO 21930:2007	Sustainability in building construction - Environmental declaration of building products
Ecoinvent v3.6	Swiss centre of life cycle inventories, www.ecoinvent.ch
GaBi 2021 Professional database	http://www.gabisoftware.com/international/databases/gabidatabases/professional/ , ts 10.0.1.92 incl. databases 2021 Edition
Silfverstrand. N; Arushanyan. Y	LCA-report for Steel sections and Cold formed structural hollow sections

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