





Welded and painted structural steel products

Based on SSAB steel material



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Owner of the declaration	Nordec Oy
Name of the product:	Welded and painted structural steel products
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Scope of the declaration	This environmental product declaration covers the environmental impacts of Steel structure. The declaration has been prepared in accordance with EN 15804:2012+A1:2013 and ISO 14025 standards and the additional requirements stated in the RTS PCR (English version, 14.6.2018). This declaration covers the life cycle stages from cradle-to-gate
 	 Laura Sariola Committee Secretary
	 Markku Hedman RTS General Director
Verified according to the requirements of EN 15804+A1 (product group rules)	
Independent verification of the declaration and data, according to ISO14025:2010	
<input type="checkbox"/> Internal <input checked="" type="checkbox"/> External	
Third party verifier: Anastasia Sipari Bionova Ltd	

General information, declaration scope and verification (7.1)

1. Owner of the declaration, manufacturer

Nordec Oy
Eteläinen Makasiinikatu 4
FI-00130 Helsinki, Finland
Timo Alanko
+358 50 3091 375
timo.alanko@nordec.com

2. Product name and number

Welded and painted steel structures:

- Structures made of hot-rolled plate, sheet and coil. Calculation represent general steel structures and following brand names: Easy Bridge, Easy Beam, WQ-beam and CWQ-beam
- Structures made of cold-formed structural hollow sections (CFSHS). Calculation represent general steel structures and following brand names: Easy Truss

3. Place of production

Peräseinäjoki and Ylivieska (Finland), Gargzdai (Lithuania) and Oborniki (Poland)

4. Additional information

<https://www.nordec.com>

5. Product Category Rules and the scope of the declaration

The declaration has been prepared in accordance with EN 15804:2012+A1:2013 and ISO 14025 standards and the additional requirements stated in the RTS PCR (English version, 14.6.2018)

6. Author of the life-cycle assessment and declaration

IVL Swedish Environmental Research Institute Ltd.,
P.O Box 210 60, S-100 31 Stockholm, Sweden
Phone +46-(0)10-788 65 00 // www.ivl.se
Authors: Karin Lindeberg, Diego Peñaloza, Josefin Gunnarsson

7. Verification

This EPD has been verified according to the requirements of EN 15804+A1 and RTS PCR by a third party. The verification has been carried out by Anastasia Sipari at Bionova Ltd

8. Declaration issue date and validity

Declaration issue date 23.6.2020. The declaration is valid 5 years.

9. Product description

This EPD represents steel structures using steel supplied from SSAB mill in Raahe. There are two product categories presented based on the type of structure and material:

- Category A: Structures made of hot-rolled plate, sheet and coil
- Category B: Structures made of cold-formed structural hollow sections (CFSHS)

The main variation of the products is in the raw materials and taken into account there. The production process is similar to all products and categories.

These steel structures are welded and painted at Nordec's factories in Ylivieska (Finland), Peräseinäjoki (Finland), Oborniki (Poland) and Gargzdai (Lithuania).

The yearly production values 2018 for the factories were used to allocate the material and energy flows for the product categories.

10. Technical specifications

Steel structures are used as building frame structures, machinery and equipment supports, bridges and as various supplementary structures. This EPD presents the average products and is not a project specific declaration.

11. Product standards

The products are fabricated according to EN 1090-2 and CE-marked according to EN 1090-1.

12. Physical properties

Dimensions of the products vary based on customer and project needs There are no single typical products and the dimensions vary as follows:

- Length of beams, columns and braces: 4 - 22m
- Length of trusses and welded beams: 13 - 38m
- Weight of beams, columns, braces and trusses: 100kg - 10tons
- Weight of welded beams: 500kg – 50tons

Detailed technical data is delivered with every delivery on CE-mark (declaration of compliance)

13. Raw-materials of the product

Raw materials are shown on table below

Raw material	Amounts in categories	
	A	B
SSAB Raahe hot rolled plate	85%	
SSAB Raahe hot rolled coil	5%	
SSAB Cold formed structural hollow sections		90%
Outfitting parts (steel)	8%	8%
Welding consumables	1%	1%
Paint	1%	1%

Share of recycled raw material is approximately 20% including pre- and post-consumer scrap. Share of post-consumer scrap (secondary material) used in calculation in product categories A: 3.8% and B: 7.3%

14. Substances under European Chemicals Agency’s REACH, SVHC restrictions

Name	EC number	CAS number
The products don't contain REACH SVHC substances.		

15. Functional / declared unit

1 kg of steel structures

16. System boundary

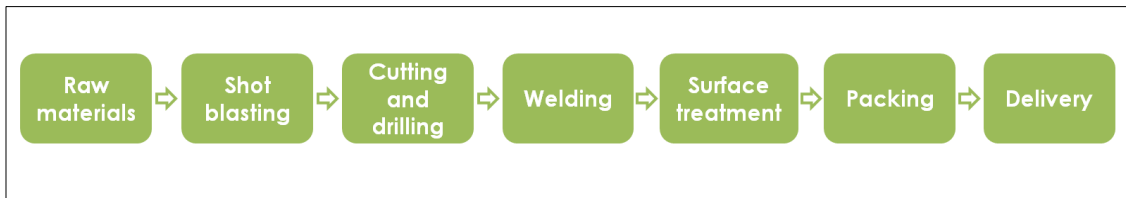
This EPD covers the following modules; A1 (Raw material supply), A2 (Transport), A3 (Manufacturing), A4 (Transport to the site), C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waster processing), C4 (Disposal) and D (Reuse, recovery, recycling) Benefits and loads beyond the system boundary.

17. Cut-off criteria

Close to 100% of all material and energy flows have been included in the model calculations. The study applies a cut-off criterion of maximum 1%, which complies with the maximum cut-off criteria established by the PCR and EN 15804 standards.

18. Production process

Steel plates and profiles are first cut by flame cutting or sawing to the required length and then welded together, shot blasted and coated with paint.



Scope of the Life-Cycle Assessment (7.2.1-2)

An “X” means that the stage is included and MND (Module Not Declared) means it is not.

Life cycle stage	Information module	Cradle to gate with options, modules C1-C4 and module D	Included in this study (X)
A1) Raw material supply	Product stage	Mandatory	X
A2) Transport			X
A3) Manufacturing			X
A4) Transport	Construction process stage	Mandatory for RTS PCR 14.6.2018 and optional for EN 15804:2012+A1:2013	X
A5) Construction installation		Optional	MND
B1) Use	Use stage	Optional	MND
B2) Maintenance			MND
B3) Repair			MND
B4) Replacement			MND
B5) Refurbishment			MND
B6) Operational energy use			MND
B7) Operational water use			MND
C1) Deconstruction, demolition	End of life stage	Mandatory for RTS PCR 14.6.2018 and optional for EN 15804:2012+A1:2013	X
C2) Transport			X
C3) Waste processing			X
C4) Disposal			X
D) Reuse, recovery, recycling potential	Benefits and loads beyond the system boundary	Mandatory for RTS PCR 14.6.2018 and optional for EN 15804:2012+A1:2013	X

19. Environmental impacts

Category A: Structures made of hot-rolled plate, sheet and coil

Parameters describing environmental impacts	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
GWP Global warming potential	kg CO ₂ equiv	2,37 E+00	3,09 E-03	1,71 E-01	2,54 E+00	3,31 E-02	2,82 E-02	1,67 E-02	2,43 E-03	7,81 E-04	-1.40 E+00
ODP Depletion potential of the stratospheric ozone layer	kg CFC-11 equiv	2,26 E-13	3,93 E-17	1,28 E-12	1,51 E-12	5,34 E-18	5,09 E-09	2,73 E-18	7,89 E-18	4,32 E-18	-8.56 E-08
AP Acidification potential of soil and water sources	kg SO ₂ equiv	5,34 E-03	7,32 E-06	4,23 E-04	5,77 E-03	8,15 E-05	2,14 E-04	4,41 E-05	1,71 E-05	4,42 E-06	-6.07 E-03
EP Eutrophication potential	kg (PO ₄) ³⁻ equiv	5,85 E-04	1,25 E-06	5,83 E-05	6,45 E-04	1,94 E-05	5,10 E-05	1,08 E-05	4,10 E-06	5,00 E-07	-2.43 E-03
POCP Formation potential of tropospheric ozone	kg ethene equiv	5,10 E-04	-9,46 E-07	6,94 E-04	1,20 E-03	-8,84 E-06	2,23 E-05	-1,58 E-05	1,89 E-06	3,42 E-07	-1.40 E-03
ADP-elements Abiotic depletion potential of tropospheric ozone	kg Sb equiv	3,92 E-06	5,33 E-10	2,14 E-08	3,94 E-06	2,22 E-09	9,46 E-09	1,18 E-09	2,72 E-09	7,41 E-11	-1.08 E-06
ADP-fossil fuels Abiotic depletion potential	MJ, net calorific value	2,61 E+01	3,80 E-02	2,42 E+00	2,86 E+01	4,46 E-01	4,06 E-01	2,24 E-01	4,68 E-02	1,04 E-02	-2.01 E+01

Category B: Structures made of cold-formed structural hollow sections (CFSHS)

Parameters describing environmental impacts	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
GWP Global warming potential	kg CO ₂ equiv	2,42 E+00	3,12 E-02	2,07 E-01	2,66 E+00	5,25 E-02	2,82 E-02	1,67 E-02	2,43 E-03	7,81 E-04	-1.40 E+00
ODP Depletion potential of the stratospheric ozone layer	kg CFC-11 equiv	2,31 E-13	5,15 E-18	1,39 E-11	1,41 E-11	8,39 E-18	5,09 E-09	2,73 E-18	7,89 E-18	4,32 E-18	-8.56 E-08
AP Acidification potential of soil and water sources	kg SO ₂ equiv	5,48 E-03	6,80 E-05	5,15 E-04	6,06 E-03	1,50 E-04	2,14 E-04	4,41 E-05	1,71 E-05	4,42 E-06	-6.07 E-03
EP Eutrophication potential	kg (PO ₄) ³⁻ equiv	5,98 E-04	1,63 E-05	6,39 E-05	6,78 E-04	3,57 E-05	5,10 E-05	1,08 E-05	4,10 E-06	5,00 E-07	-2.43 E-03
POCP Formation potential of tropospheric ozone	kg ethene equiv	5,23 E-04	-2,20 E-05	8,73 E-04	1,37 E-03	-1,09 E-05	2,23 E-05	-1,58 E-05	1,89 E-06	3,42 E-07	-1.40 E-03
ADP-elements Abiotic depletion potential of tropospheric ozone	kg Sb equiv	3,99 E-06	2,22 E-09	2,25 E-08	4,01 E-06	3,44 E-09	9,46 E-09	1,18 E-09	2,72 E-09	7,41 E-11	-1.08 E-06
ADP-fossil fuels Abiotic depletion potential	MJ, net calorific value	2,68 E+01	4,23 E-01	3,19 E+00	3,04 E+01	7,07 E-01	4,06 E-01	2,24 E-01	4,68 E-02	1,04 E-02	-2.01 E+01

20. Use of natural resources (7.2.4)

Category A: Structures made of hot-rolled plate, sheet and coil

Parameters describing environmental impacts	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Use of renewable primary energy used as energy carrier	MJ, net calorific value	7,87 E-01	1,15 E-02	1,30 E+00	2,10 E+00	2,40 E-02	2,37 E-03	1,31 E-02	3,46 E-03	1,37 E-03	-9.14 E-01
Use of renewable primary energy resources used as raw material	MJ, net calorific value	0	0	0	0	1,79 E-10	0	0	0	0	0
Total use of renewable primary energy resources	MJ, net calorific value	7,87 E-01	1,15 E-02	1,30 E+00	2,10 E+00	2,40 E-02	2,37 E-03	1,31 E-02	3,46 E-03	1,37 E-03	-9.14 E-01
Use of non-renewable primary energy used as energy carrier	MJ, net calorific value	2,66 E+01	4,83 E-02	3,62 E+00	3,03 E+01	4,47 E-01	4,10 E-01	2,25 E-01	4,86 E-02	1,08 E-02	-2.22 E+01
Use of non-renewable primary energy used as raw material	MJ, net calorific value	0	0	0	0	2,17 E-05	2,07 E-08	1,18 E-05	1,77 E-06	3,99 E-07	-3.21 E-06
Total use of non-renewable primary energy resources	MJ, net calorific value	2,66 E+01	4,83 E-02	3,62 E+00	3,03 E+01	4,47 E-01	4,10 E-01	2,25 E-01	4,86 E-02	1,08 E-02	-2.22 E+01
Use of secondary material	kg	3,75 E-02	0	0	3,65 E-02	0	0	0	0	0	0
Use of renewable secondary fuels	MJ, net calorific value	9,36 E-23	0	0	9,19 E-23	0	0	0	0	0	0
Use of non-renewable secondary fuels	MJ, net calorific value	1,10 E-21	0	0	1,08 E-21	0	0	0	0	0	0
Net use of fresh water	m ³	-1,54 E-03	1,42 E-05	1,91 E-03	5,42 E-05	4,06 E-05	5,55 E-05	2,21 E-05	1,45 E-05	2,72 E-06	-8.15 E-03

Category B: Structures made of cold-formed structural hollow sections (CFSHS)

Parameters describing environmental impacts	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Use of renewable primary energy used as energy carrier	MJ, net calorific value	1,00 E+00	2,46 E-02	1,24 E+00	2,26 E+00	3,67 E-02	2,37 E-03	1,31 E-02	3,46 E-03	1,37 E-03	-9.14 E-01
Use of renewable primary energy resources used as raw material	MJ, net calorific value	0	0	0	0	2,80 E-10	0	0	0	0	0
Total use of renewable primary energy resources	MJ, net calorific value	1,00 E+00	2,46 E-02	1,24 E+00	2,26 E+00	3,67 E-02	2,37 E-03	1,31 E-02	3,46 E-03	1,37 E-03	-9.14 E-01
Use of non-renewable primary energy used as energy carrier	MJ, net calorific value	2,75 E+01	4,24 E-01	4,10 E+00	3,20 E+01	7,10 E-01	4,10 E-01	2,25 E-01	4,86 E-02	1,08 E-02	-2.22 E+01
Use of non-renewable primary energy used as raw material	MJ, net calorific value	0	0	0	0	3,30 E-05	2,07 E-08	1,18 E-05	1,77 E-06	3,99 E-07	-3.21 E-06
Total use of non-renewable primary energy resources	MJ, net calorific value	2,75 E+01	4,24 E-01	4,10 E+00	3,20 E+01	7,10 E-01	4,10 E-01	2,25 E-01	4,86 E-02	1,08 E-02	-2.22 E+01
Use of secondary material	kg	7,26 E-02	0	0	3,75 E-02	0	0	0	0	0	0
Use of renewable secondary fuels	MJ, net calorific value	9,55 E-23	0	0	9,36 E-23	0	0	0	0	0	0
Use of non-renewable secondary fuels	MJ, net calorific value	1,12 E-21	0	0	1,10 E-21	0	0	0	0	0	0
Net use of fresh water	m ³	5,51 E-04	4,16 E-05	1,65 E-03	1,52 E-04	6,20 E-05	5,55 E-05	2,21 E-05	1,45 E-05	2,72 E-06	-8.15 E-03

OTHER INDICATORS (Standard 7.2.5)

21. End of life – Waste and output flows

Category A: Structures made of hot-rolled plate, sheet and coil

Other environmental information describing waste categories	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste disposed	kg	7,01 E-04	1,30 E-09	1,62 E-04	8,63 E-04	2,30 E-08	0	1,26 E-08	1,52 E-09	1,84 E-10	0
Non-hazardous waste disposed	kg	6,80 E-02	2,02 E-05	1,20 E-01	1,90 E-01	3,37 E-05	0	1,83 E-05	9,85 E-06	5,01 E-02	0
Radioactive waste disposed	kg	1,84 E-04	4,09 E-06	4,88 E-04	6,76 E-04	0	0	0	0	0	0
Other environmental information describing output flows	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0
Materials for recycling	kg	0	0	1,90 E-01	1,90 E-01	0	9,50 E-01	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0
Exported electrical energy	MJ, net calorific value	0	0	0	0	0	0	0	0	0	0
Exported thermal energy	MJ, net calorific value	0	0	0	0	0	0	0	0	0	0

Category B: Structures made of cold-formed structural hollow sections (CFSHS)

Other environmental information describing waste categories	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste disposed	kg	7,20 E-04	2,37 E-08	1,65 E-03	2,37 E-03	3,51 E-08	0	1,26 E-08	1,52 E-09	1,84 E-10	0
Non-hazardous waste disposed	kg	6,96 E-02	3,45 E-05	4,69 E-02	1,20 E-01	5,15 E-05	0	1,83 E-05	9,85 E-06	5,01 E-02	0
Radioactive waste disposed	kg	2,83 E-04	5,75 E-07	3,69 E-04	6,53 E-04	0	0	0	0	0	0
Other environmental information describing output flows	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	0	0	0	0	0	0	0	0	0	0
Materials for recycling	kg	0	0	3,36 E-02	3,36 E-02	0	9,50 E-01	0	0	0	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0
Exported electrical energy	MJ, net calorific value	0	0	0	0	0	0	0	0	0	0
Exported thermal energy	MJ, net calorific value	0	0	0	0	0	0	0	0	0	0

Scenarios and additional technical information (7.3)

22. Energy in the manufacturing phase (7.3. A3)

Parameter	Value	Data quality
A3 Electricity information and CO ₂ emission kg CO ₂ ekv. /kWh for Finnish production	0.171	Thinkstep (2016) FI: Electricity grid mix 1kV-60kV
A3 Electricity information and CO ₂ emission kg CO ₂ ekv. /kWh for Lithuanian production	0.612	Thinkstep (2016) LT: Electricity grid mix 1kV-60kV
A3 Electricity information and CO ₂ emission kg CO ₂ ekv. /kWh for Polish production	0.916	Thinkstep (2016) PL: Electricity grid mix 1kV-60kV

23. Additional technical information, transport to the building site (7.3.2, A4)

Transportation to the building site (A4 module) has been modelled so that six cities were chosen as the destination (Helsinki, Stockholm, Oslo, Vilnius, Warsaw and Prague). Deliveries to these destinations were divided based on the market share that each site has in specific destination. This was done separately for each product category (A-D).

Parameter	Value & Data quality
Fuel type and consumption of vehicle used for transport	Truck average diesel consumption 0.34 l/km and average emissions 0.02 kg CO ₂ /tkm Ship average LFO consumption 69.2 l/km and average emissions 0.014 kg kg CO ₂ /tkm
Distance	Average transport distance 785 km
Capacity utilization	86% for truck and 70% for boat
Bulk density of transported products	Bulk density varies depending on product type and thickness
Volume capacity utilization factor	1

24. End-of-life process description (7.3.4)

Process flow	Unit	Amount kg/kg
Collection process specified by type	kg collected separately	1
	kg collected with mixed construction waste	
Recovery system specified by type	kg for re-use	
	kg for recycling	0.95
	kg for energy recovery	
Disposal specified by type	kg product or material for final deposition	0.05
Assumptions for scenario development	units as appropriate	Transportation with 20 ton EURO5 truck with load factor 45% (empty returns included) from site to recycling facility 150km (estimated).

25. Additional information related to transports to Oslo

As an example the table below shows information for

- Category A: transport from Ylivieska to Oslo
- Category B: transport from Peräseinäjoki to Oslo

Parameter	Value for category A	Value for category B
Fuel type and consumption of vehicle used for transport	Truck-trailer 20 ton, EURO5 30% and EURO6 70% Boat = Ro-Ro ferry 10000 ton	Truck-trailer 20 ton, EURO5 10% and EURO6 90% Boat = Ro-Ro ferry 10000 ton
Distance	1090 km on truck and 302 km on boat	874 km on truck and 302 km on boat
Capacity utilization	86% for truck and 70% for boat	
Bulk density of transported products (kg/m3)	Bulk density varies depending on product type and thickness	
Volume capacity utilization factor	1	

26. References

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