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The Norwegian EPD Foundation

ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Metacon AS
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-1913-839-EN
Registration number:	NEPD-1913-839-EN
ECO Platform reference number:	-
Issue date:	04.11.2019
Valid to:	04.11.2024

IHULT - Luxembourg

Metacon AS
www.epd-norge.no

General information

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IHULT - Luxembourg

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Declaration number:
NEPD-1913-839-EN

Place of production:
Raw material supply from Luxembourg
Manufacturing in Norway

ECO Platform reference number:

Management system:

This declaration is based on Product Category Rules:
CEN Standard EN 15804 serves as core PCR
NPCR Part A: Construction products and services
NPCR 013 rev1 08/13
NPCR 013:2019 Part B for Steel and aluminium construction

Organisation no:
994 925 954 MVA

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

Issue date:
04.11.2019

Valid to:
04.11.2024

Declared unit:
Per 1kg steel from cradle to gate

Year of study:
2019

Declared unit with options (A1-A4, C1-C4, D):
Per 1 kg steel from cradle to gate

Comparability:
EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

Functional unit:
Not relevant for cradle-to-gate

The EPD has been worked out by:
Michael M. Jenssen, Asplan Viak

Verification:
The CEN Norm EN 15804 serves as the core PCR.
Independent verification of the declaration and data, according to ISO14025:2010

☐ internal ☑ external

Third party verifier:
Lars G. F. Tellnes, Ostfold Research
Independent verifier approved by EPD Norway

Approved
Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:
High strenght structural steel sections intended for bolted, welded or otherwise connected constructions of buildings, bridges and other structures.

Technical data:
Dimensions: IPE 80-600, HEA/B/M 100-600, UNP/UPE 80-400, L 40-200, L 65x50 -200x150, T 30-140 and wide steels:160-500, t=5-40. Steel grade ≤ S355. EN 10025 and EN1090-2 standards are applied.

Product specification:
Product composition:

Materials	kg	%
Alloyed steel	0,99	99 %
Paints	0,01	1 %

Market:
Norway

Reference service life, product:
Not relevant for cradle to gate

Reference service life, building:
Not relevant for cradle to gate

LCA: Calculation rules

Declared unit:
Per 1 kg steel from cradle to gate

System boundary:
Cradle to gate with options (A1-A4, C1-C4, D):

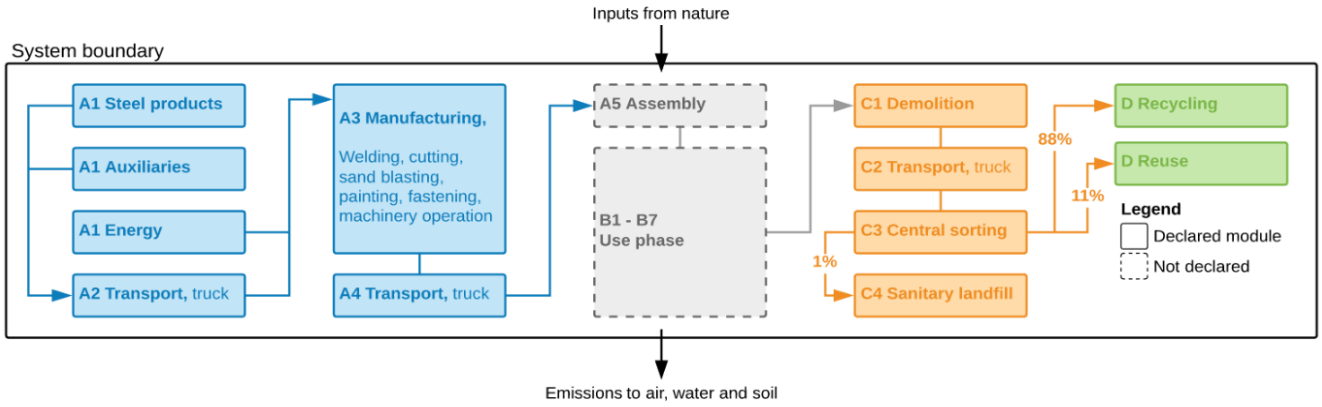

Figure 1: Flowchart showing the system boundaries.

Data quality:
General requirements and guidelines concerning the use of generic and specific data and the quality of those are as described in EN 15804: 2012+A1:2013, clause 6.3.6 and 6.3.7. The data is representative according to temporal, geographical and technological requirements. Databases used have been ecoinvent v3.4 and supplier's EPD (EPD-ARM-20180070-IBD1-EN). Calculations have been carried out using Simapro v8.5.

Temporal:
Data for use in module A3 is supplied by the manufacturer and consists of recorded and calculated amounts of specific material and energy consumption for the site. Specific data has been collected for 2018. Generic data has been created or updated within the last 10 years. Any exceptions are documented in the LCA-report.

Geographical:
The product included in this EPD is manufactured in Norway and is representative for the Norwegian market. Best available proximations are used where Norwegian-specific data are unavailable.

Technological:
Data represents technology in use.

Cut-off criteria:
All major raw materials and all the essential energy is included. The production process for raw materials and energy flows that are included with very small amounts (<1%) are not included. This cut-off rule does not apply for hazardous materials and substances.

Allocation:
The allocation is made in accordance with the provisions of EN 15804. Input flows, wastes and emissions are allocated equally among all products through mass allocation.

Benefits and loads beyond the system boundary (module D):
Module D is provided by the supplier (EPD-ARM-20180070-IBD1-EN), and is calculated using the worldsteel methodology, taking into account the potential environmental benefit and burden from net new scrap consumption.

LCA: Scenarios and additional technical information

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

Transportation scenarios
Transport in A2 describes the transport of steel products from Luxembourg, via a Norwegian supplier, to Metacon's facilties in Rakkestad.

Transportation scenarios for waste are based on the recorded distance to the waste management company used. Distances to final waste handling provided by Avfall Norge (Raadal et al., 2009).

Distance to building site according to NPCR 013 Part B. For an estimation of impacts from distances to site other than the one provided in A4, please use the transport calculator provided by Østfoldforskning AS on behalf of EPD-Norway. It can be found here: https://lca.no/transportkalkulator/

Capacity utilization has been calculated by dividing the average load by the maximum load as they are reported in ecoinvent v3.4. Fuel consumption as given in ecoinvent v3.4. Load factor as reported by ecoinvent.

End of life scenario
A 99% recovery rate is provided by the supplier; 88% to recycling, 11% to reuse, leaving 1% to landfilling (EPD-ARM-20170033-IBD1-EN).

Transportation scenarios for modules A4 and C2

Type	Module	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Unit
Truck	A4	44	Lorry >32t EURO5	300	0,022	l/tkm
Waste collection	C2	50	Lorry 21t	19	0,391	l/tkm
Truck	C2	26	Lorry 7,5-16t EURO5	278	0,044	l/tkm

End of Life (C1, C3, C4)

	Unit	Value
Hazardous waste disposed	kg	0
Collected as mixed construction waste	kg	0
Reuse	kg	0,11
Recycling	kg	0,88
Energy recovery	kg	0
To landfill	kg	0,01

Benefits and loads beyond the system boundaries (D)

	Unit	Value
Net new scrap	kg	-0,139

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

Product stage			Assemby stage		Use stage							End of life stage				Beyond the system boundaries
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	MND	MND	X	X	X	X	X

Environmental impact

Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D	
GWP	kg CO_2 -eqv	6,24E-01	2,59E-02	2,15E-02	6,86E-02	2,19E-04	5,30E-05	1,78E-01	
ODP	kg CFC11-eqv	1,30E-08	5,11E-09	3,87E-09	1,23E-08	2,61E-11	1,77E-11	-2,48E-13	
POCP	kg C_2H_4 -eqv	1,69E-04	4,13E-06	4,30E-06	1,14E-05	5,97E-08	1,94E-08	9,52E-05	
AP	kg SO_2 -eqv	2,52E-03	8,37E-05	1,63E-04	2,47E-04	1,25E-06	3,95E-07	2,75E-04	
EP	kg PO_4^{3-}-eqv	2,56E-04	1,42E-05	3,51E-05	4,63E-05	2,73E-07	6,81E-08	1,60E-05	
ADPM	kg Sb-eqv	7,01E-07	5,06E-08	7,21E-09	1,54E-07	2,15E-09	6,10E-11	3,88E-06	
ADPE	MJ	7,58E+00	4,08E-01	3,09E-01	9,89E-01	2,91E-03	1,51E-03	1,57E+00	

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-A3	A4	C1	C2	C3	C4	D	
RPEE	MJ	2,04E+00	6,51E-03	1,66E-03	1,02E-02	1,51E-02	2,80E-05	-3,39E-01	
RPEM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
TPE	MJ	2,04E+00	6,51E-03	1,66E-03	1,02E-02	1,51E-02	2,80E-05	-3,39E-01	
NRPE	MJ	1,03E+01	4,20E-01	3,12E-01	1,01E+00	3,78E-03	1,54E-03	1,21E+00	
NRPM	MJ	3,73E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
TRPE	MJ	1,06E+01	4,20E-01	3,12E-01	1,01E+00	3,78E-03	1,54E-03	1,21E+00	
SM	kg	1,15E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
W	m^3	8,54E-03	8,91E-05	4,22E-05	1,68E-04	1,13E-04	1,69E-06	-1,22E-04	

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-A3	A4	C1	C2	C3	C4	D	
HW	kg	1,19E-03	2,13E-07	1,39E-07	5,10E-07	5,54E-09	1,08E-09	2,67E-07	
NHW	kg	4,81E-02	3,66E-02	3,40E-04	3,46E-02	1,05E-04	1,00E-02	-2,56E-02	
RW	kg	1,03E-03	2,95E-06	2,17E-06	7,01E-06	2,12E-08	9,96E-09	-1,07E-04	

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

End of life - Output flow

Parameter	Unit	A1-A3	A4	C1	C2	C3	C4	D	
CR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,10E-01	0,00E+00	0,00E+00	
MR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,80E-01	0,00E+00	0,00E+00	
MER	kg	7,39E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
EEE	MJ	5,71E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	
ETE	MJ	4,65E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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 = $9,0*10^{-3}$ = 0,009

Interpretation

Figure 2 shows a contribution analysis for all modules, except module D. Because the steel input in A1 comes from scrap-based Electric Arc Furnace production, raw material supply contributes less than average of the total life-cycle results compared to other steel EPDs on the market. Results in A3 are therefore sensitive to increases and decreases of auxiliary and ancillary materials, particularly for paint systems. Different product dimensions and applications will require inputs of paint in larger or lesser quantities than the average used as a basis for this analysis. The error bars in Figure 2 therefore display a sensitivity check for each impact category, showing the potential variation of impacts given a 50% increase or decrease in paint use.

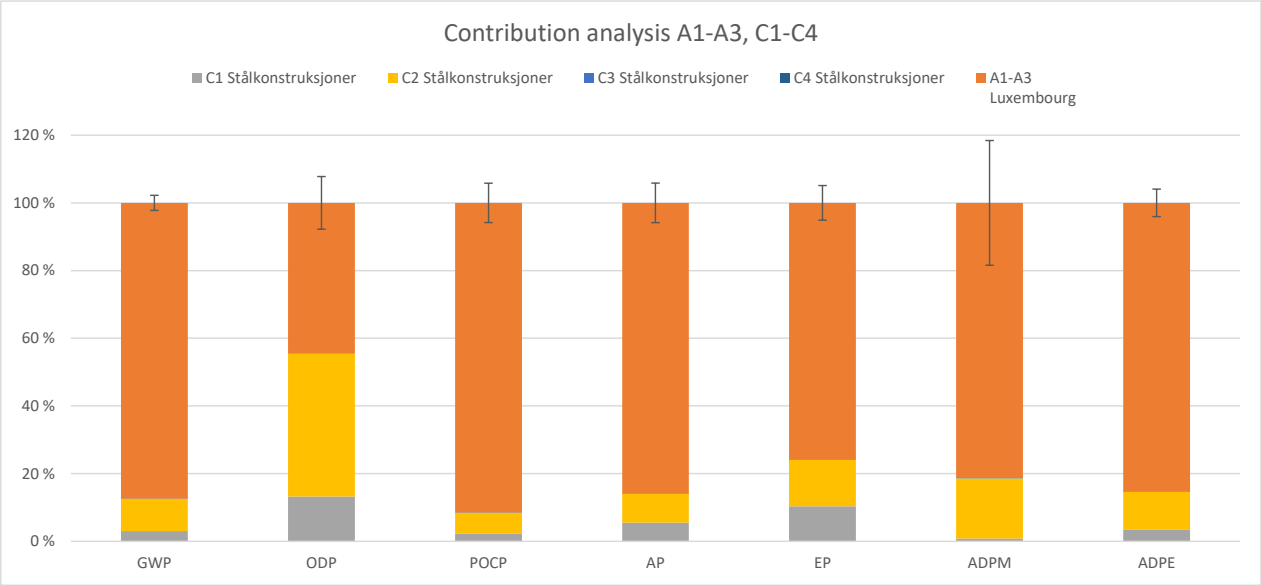

Figure 2: Contribution analysis for modules A1-A3, C1-C4. The error bars display percentage variation of impacts given a 50% increase/decrease in paint use.

Additional Norwegian requirements

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

The electricity mix used in the manufacturing stage (A3) is specific to Norwegian electricity production and imports, transformed to medium voltage (including the transmission network; direct emissions to air; electricity losses during transmission). Reference year: 2014.

Data source	Amount	Unit
ecoinvent v3.4	0,0276	kg CO_2-eqv/kWh

Dangerous substances

☑ The product contains no substances given by the REACH Candidate list or the Norwegian priority list.[1]

☐ The product contains substances given by the REACH Candidate list or the Norwegian priority list that are less than 0,1 % by weight.

☐ The product contain dangerous substances, more then 0,1% by weight, given by the REACH Candidate List or the Norwegian Priority list, see table.

☐ The product contains no substances given by the REACH Candidate list or the Norwegian priority list. The product is classified as hazardous waste (Avfallsforskiften, Annex III), see table.

[1]No substances as given by REACH are used or have been added to the production

Indoor environment

No tests have been carried out on the product concerning indoor climate.

Carbon footprint

Carbon footprint has not been worked out for the product.

Bibliography

EN 15804:2012+A1:2013	*Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products*
EPD-ARM-20180070-IBD1-EN	*Structural Steel Sections from Electric Arc Furnaces - ArcelorMittal*
EN 10025	*Hot rolled products of structural steels*
EN 1090-2:2018	*Execution of steel structures and aluminium structures - Part 2: Technical requirements for steel structures*
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*
ISO 21930:2007	*Sustainability in building construction - Environmental declaration of building products*
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