

ENVIRONMENTAL PRODUCT DECLARATION

in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Celsa Steel Service AS
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-434-305-EN
ECO Platform reference number:	00000370
Issue date:	30.05.2016
Valid to:	30.05.2021

Steel reinforcement products for concrete

Celsa Steel Service AS



www.epd-norge.no



General information

Product:

Steel reinforcement products for concrete

Program operator:

The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway
Phone: (+47) 23 08 82 92
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Declaration number:

NEPD-434-305-EN

ECO Platform reference number:

00000370

This declaration is based on Product Category Rules:

CEN Standard EN 15804 serves as core PCR
PCR 2012:01 Construction products and Construction services, v.2.0, 2015-03-03

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 manufacturer information, life cycle assessment data and evidences.

Declared unit:

Per kg steel

Declared unit with option:

A1-3 + A4

Functional unit:**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:



Martin Erlandsson, PhD
Independent verifier approved by EPD Norway

Owner of the declaration:

Celsa Steel Service AS

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Place of production:

Norway

Management system:

ISO 14001, ISO 9001
Celsa Armeringsstål; EMAS, OHSAS 18001

Organisation no:

980 345 106

Issue date:

30.05.2016

Valid to:

30.05.2021

Year of study:

2015

Comparability:

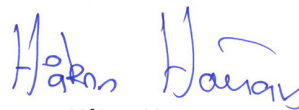
EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

The EPD has been worked out by:

Mats Almemark



Approved



Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

The EPD considers reinforcement steel made out of hot rolled products, transformed into cut and bend, mesh (Oslo), BAMTEC® (Oslo), to an extensive production of prefabricated reinforcement elements (special welded products).

Product specification:

Product content weight %

Materials	kg	%
Iron	0.98-0.99	98–99
Carbon	0.005-0.02	0,05–0,2
Manganese	0.03-0.07	0,3–0,7
Silicon	0.02	0,2

Technical data:

The product certified in accordance with Norwegian standards NS 3576 (1,3, and 4), and EN 10080:2005

Market:

Norway (EPD for Sweden, Finland and Denmark are available on request)

Reference service life, product:

Not relevant

Recycled content of steel:

>99 %

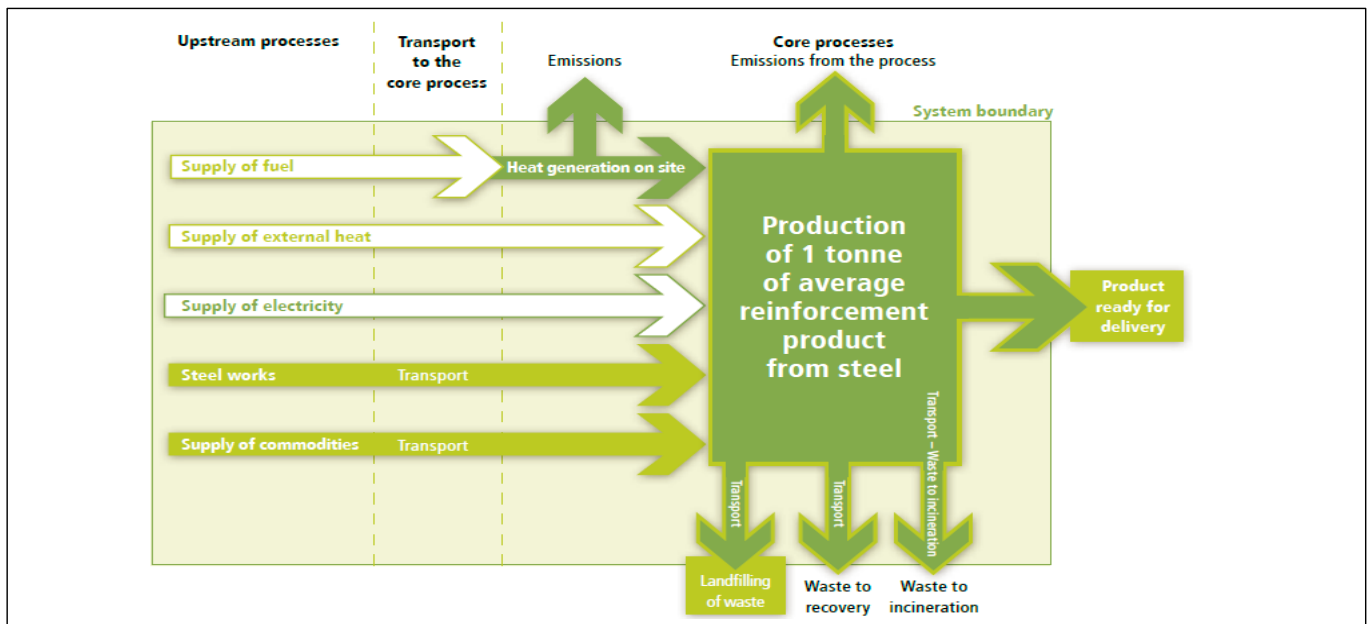
LCA: Calculation rules

Declared unit:

Per kg steel

System boundary:

The production of low-alloyed steel from scrap and additional alloying metals is done in an electric arc furnace (EAF) in Mo i Rana, Norway. Scrap is transported from Norway (approx. 80%) and imports (approx. 20-25%) from Sweden, Finland and Denmark to the steel works in Mo i Rana, Norway. After hot rolling the products are transported with vessels as coils or straight bars to the production sites in Norway where they are worked up to reinforcement products.



Data quality:

Site specific data on use of fuels and commodities provided have been used for the steel production in Norway. Site specific data from Celsa Steel Service is used for the core process. Site specific data from 2013. Electricity production data according to country averages have been used for electricity consumed. Specific data from the suppliers has been collected wherever possible. Otherwise generic data has been collected from commercial databases GaBi professional database (PE International) and Ecoinvent. By the selection of data the geographical location of each supplier has been considered to the extent possible.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water 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 recycling process and transportation of the material is allocated to this analysis.

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.

LCA: Scenarios and additional technical information

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

The scenario for transportation in A4 is based on relevant type of truck and utilization. Distance is set to 500 km. Celsa Steel Service has seven sites for production in Norway to minimize transportation distances.

Transport from production place to user (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck	70	Truck-trailer Euro 5 27 t	500	0,018 l/tkm	-

Reference: Thinkstep ProfDB 2013

LCA: Results

1 kg of reinforcement steel products for concrete. The environmental performance is divided into the upstream process (A1), transportation to production sites (A2), fabrication at Celsa Steel Service (A3), and transportation to construction sites (A4).

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

Product stage					Assembly 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	MND	MND	MND	MND	MND	

Environmental impact

Parameter	Unit	A1	A2	A3	A1- A3	A4*			
GWP	kg CO ₂ -eqv	3,30E-01	2,40E-02	5,90E-03	3,60E-01	2,90E-02			
ODP	kg CFC11-eqv	2,90E-09	9,50E-14	2,50E-16	2,90E-09	1,90E-13			
POCP	kg C ₂ H ₄ -eqv**	4,10E-05	2,10E-05	-7,80E-07	6,10E-05	-2,70E-05			
AP	kg SO ₂ -eqv	4,90E-04	2,10E-04	1,00E-05	7,10E-04	8,70E-05			
EP	kg PO ₄ ³⁻ -eqv	1,00E-04	5,00E-05	1,90E-06	1,60E-04	2,20E-05			
ADPM	kg Sb-eqv	1,40E-07	7,10E-10	2,60E-12	1,40E-07	1,30E-09			
ADPE	MJ	1,59E+00	3,24E-01	8,90E-05	1,91E+00	3,88E-01			

*Transport distance is 500 km, **Reported emissions of nitrogen monoxide with negative POCP from trucks, also including impact from NOx

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	3,66E+00	6,60E-04	3,00E-05	3,66E+00	2,20E-02			
RPEM	MJ	3,10E-03	-	-	3,10E-03	-			
TPE	MJ	3,66E+00	6,60E-04	3,00E-05	3,66E+00	2,20E-02			
NRPE	MJ	1,63E+00	3,25E-01	9,80E-05	1,95E+00	3,90E-01			
NRPM*	MJ	6,74E-02	-	-	6,74E-02	-			
TRPE	MJ	1,70E+00	3,25E-01	9,80E-05	2,02E+00	3,90E-01			
SM	kg	1,13E+00	-	-	1,13E+00	-			
RSF	MJ	2,60E-04	2,00E-06	2,10E-07	2,70E-04	3,10E-06			
NRSF	MJ	1,02E+00	2,10E-05	2,20E-06	1,02E+00	3,30E-05			
W	m ³	4,00E-02	2,00E-06	8,40E-08	4,00E-02	3,60E-06			

* Primary energy and primary energy resources used as raw materials

In A1 - Includes the energy combustion of 0.2 % w/w of carbon in the steel (32.7 MJ/kg C (graphite))

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	1,10E-04	6,20E-09	5,90E-05	1,70E-04	1,90E-07			
NHW	kg	2,20E-01	7,30E-04	1,70E-03	2,22E-01	2,00E-03			
RW	kg	9,20E-06	3,90E-07	3,40E-09	9,20E-06	8,10E-07			

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

End of life - Output flow*

Parameter	Unit								
CR	kg	-							
MR	kg	-							
MER	kg	-							
EEE	MJ	-							
ETE	MJ	-							

*Indicators not assessed

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

Additional Norwegian requirements

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

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

Data source	Amount	Unit
Econinvent	0,024	kg CO ₂ -eqv/kWh

Dangerous substances

- The product contains no substances given by the REACH Candidate list or the Norwegian priority list
- 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 (Avfallsforkiften, Annex III), see table.

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	<i>Environmental labels and declarations - Type III environmental declarations - Principles and procedures</i>
ISO 14044:2006	<i>Environmental management - Life cycle assessment - Requirements and guidelines</i>
EN 15804:2012+A1:2013	<i>Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products</i>
ISO 21930:2007	<i>Sustainability in building construction - Environmental declaration of building products</i>
PCR 2012:01	Construction Products and Construction Services, version 2.0, 2015-03-03
LCA Report	LCA of Reinforcement Products from Celsa Steel Service in Sweden, Norway, Denmark, and Finland", IVL-Report U 5330, 2015.
The International EPD System S-P-00306	Celsa Steel Service AS; Steel Reinforcement Products for Concrete, EPD in accordance with ISO 14025 and EN 15804
Other references	Technical University of Denmark, <i>Environmental Design of Industrial Products (EDIP)</i> Swiss Federal Laboratories for Materials Testing and Research (EMPA), <i>Ecoinvent 2.0</i> , Database Swiss Centre for Life Cycle Inventories, Dubendorf, Switzerland, www.ecoinvent.ch PE International (2014), <i>LCA Software GaBi 6.2</i> , Thinkstep, Life Cycle Engineering, Stuttgart, www.pe-international.com

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