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The Norwegian EPD Foundation

ENVIRONMENTAL PRODUCT DECLARATION

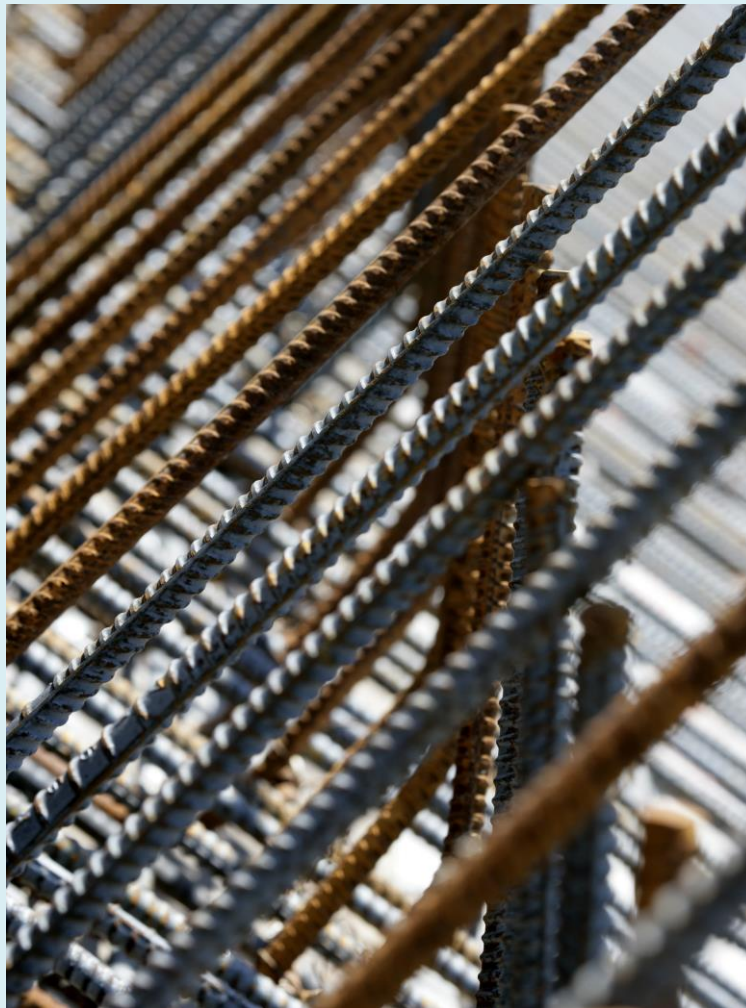
in accordance with ISO 14025, ISO 21930 and EN 15804

Owner of the declaration:	Skanska inköp Sverige AB
Program operator:	The Norwegian EPD Foundation
Publisher:	The Norwegian EPD Foundation
Declaration number:	NEPD-2082-939-EN
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ECO Platform reference number:	-
Issue date:	04.03.2020
Valid to:	04.03.2025

Rebars - Poland region 1

Skanska Sverige Inköp AB

SKANSKA



General information

Product:

Reinforcement steel; straight bars, cut and bent (C&B), mesh, roll mesh and prefabricated cages.

Program operator:

The Norwegian EPD Foundation
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Declaration number:

NEPD-2082-939-EN

ECO Platform reference number:

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A1:2013 serves as core PCR. NPCR 013 2019 Part B for Steel and Aluminium Construction Products

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:

1 kg rebar

Declared unit with option:

—

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:

Michael M. Jenssen

Michael M. Jenssen, Asplan Viak AS
(Independent verifier approved by EPD Norway)

Owner of the declaration:

Skanska Sverige Inköp AB
Contact person: Magnus Randver
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Manufacturer:

Skanska Sverige Inköp AB

Place of production:

The declaration is an average value for deliveries during 2018 reinforcement workshops in the Polen region No 1; Golub-Dobrzyn, Zawiercie and Nieporet. Importing takes place via a port in Ystad and deliveries normally go directly to the construction site.

Management system:

Skanska's entire operations are certified in accordance with ISO 14001 (environment), ISO 9001 (quality) and OHSAS 18001 (work environment).

Organisation no:

556528-3826

Issue date:

04.03.2020

Valid to:

04.03.2025

Year of study:

2018

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:

IVL Swedish Environmental Research Institute



Diego Peñaloza

Approved

Håkon Hauan

Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

In general, it can be assumed that reinforcing steel has a density of 7.8 kg/dm³. The EPD comprises an average of the following products produced from the respective rebar workshop:

- Hot rolled straight steel/bars; diameter: 8-32 mm
- C&B; cut and bent, diameter: 8-32 mm
- Roll mesh; spinmaster and bamtech
- Mesh; cold rolled welded reinforcing steel
- Prefabricated reinforcement baskets

Technical data:

In Sweden, reinforcing steel is used according to the application standard SS 212540: 2014 and welded reinforcement is certified according to EN ISO 17 660-2: 2006. In Finland: SFS 1300: 2017, SFS 167, SFS1257, SFS 1268, EN 10080: 2005 and in Norway; NS EN 10080: 2006, NS 3576-3: 2012.

Market:

Sweden, Norway, Finland

Reference service life. product:

The service life of the reinforcement is determined by the quality of the concrete, the depth of the decking and the environment in which the construction is located.

Content declaration, weight-%:

For this purpose reinforcing steel is used according to standard SS212540: 2014. Reinforcement consists of steel and alloys. The raw steel for the steel product consists of 100% of secondary steel.

Packaging materials, weight-%:

Any packaging material will be returned.

LCA: Calculation rules

Declared unit:

1 kg rebar

System boundaries:

A1-A5, C1-C4



System boundaries:

The inventory includes everything from the extraction of raw materials to the production of reinforcement (A1), transport (A2) and an average of the machining of the reinforcement done in the reinforcement workshop (A3). Module A4 includes a weighted average value of transport from the respective reinforcement workshop in the region to the nearest Swedish port.

Cut-off criteria:

All known raw materials and all the energy is included.

Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming resource use 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.

Variation:

The variation within the product group is considerably less than the maximum allowable +/- 10%, since the proportion of the environmental impact from the reinforcement workshop is small in relation to upstream parts, i.e. A1. For each region, an average value is calculated based on deliveries during 2018. To get an idea of a maximum deviation for GWP_{GHG}, it is 694 - 712 kg CO₂e for the region covered by this EPD.

Data quality:

The underlying inventory is based on data from 2018 and specific inventory data from all reinforcement workshops has been used. For each region, an average value has been calculated taking into account quantities delivered from the region during 2018.

For electrical steel manufacturing and hot rolling, the LCA calculations have been based either on data from EPDs (which are then classified as representative of the product), or data from the specific supplier, in the form of the percentage of secondary steel. For those steel mills that also reported energy use, these data have been used to parameterize an otherwise conservative general inventory process for the steel production and the hot rolling. These processes conservative process data are based on inventories from ecoinvent that have been made conservative with regard to average data from 2010 (i.e. the data is inherently older).

Generally, in the inventory, specific transport distances have been used and representative utilisation rates and vehicles types. In all manufacturing processes, national electricity mixes have been used (module A1-A3). Apart from process data for electric arc furnace and hot rolling, inventory data from GABI is used.

A weighted assessment of the proportion of product-specific data representative of the declared reinforcement is 95%, where EPD data is simplified classified as product-specific measured data). Product-specific data includes the following three types; 1) measured data, 2) literature data 3) conservative from generic databases.

LCA data that cannot be considered representative and / or can prove to be conservative is called proxy data and constitutes the fourth class in the data quality classification above.

LCA: Results

The result is given per kg rebar.

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	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

Environmental impact

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP	kg CO ₂ -eqv	6,98E-01	4,21E-02	8,54E-04	2,61E-06	2,47E-06	2,56E-06	0,00E+00	0,00E+00
ODP	kg CFC11-eqv	6,54E-10	6,88E-18	1,20E-19	3,69E-22	4,04E-22	8,30E-21	0,00E+00	0,00E+00
POCP*	kg C ₂ H ₄ -eqv	1,92E-04	-3,51E-05	1,36E-07	4,16E-10	-2,03E-09	1,99E-09	0,00E+00	0,00E+00
AP	kg SO ₂ -eqv	1,83E-03	1,14E-04	1,23E-06	3,78E-09	5,93E-09	1,80E-08	0,00E+00	0,00E+00
EP	kg PO ₄ ³⁻ -eqv	3,00E-04	2,62E-05	1,70E-07	5,21E-10	1,44E-09	4,31E-09	0,00E+00	0,00E+00
ADPM	kg Sb-eqv	5,00E-07	2,95E-09	2,32E-11	7,10E-14	1,74E-13	2,86E-12	0,00E+00	0,00E+00
ADPE	MJ	6,68E+00	5,65E-01	1,18E-02	3,61E-05	3,31E-05	4,93E-05	0,00E+00	0,00E+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

* The GaBi quantities model separates NOx into NO and NO2 in combination with a characterisation model with a marginal approach for POCP that is based on high-polluted ambient air, which can result in a negative characterisation factor for nitrogen monoxide.

Resource use

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
RPEE	MJ	8,86E-01	3,26E-02	3,64E-05	1,11E-07	1,93E-06	3,64E-06	0,00E+00	0,00E+00
RPEM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
TPE	MJ	8,86E-01	3,26E-02	3,64E-05	1,11E-07	1,93E-06	3,64E-06	0,00E+00	0,00E+00
NRPE	MJ	6,89E+00	1,49E-01	1,18E-02	3,62E-05	3,33E-05	5,12E-05	0,00E+00	0,00E+00
NRPM	MJ	1,87E-04	0,00E+00	0,00E+00	1,99E-11	1,75E-09	1,86E-09	0,00E+00	0,00E+00
TRPE	MJ	6,89E+00	1,49E-01	2,95E-01	3,62E-05	3,33E-05	5,12E-05	0,00E+00	0,00E+00
SM	kg	9,45E-01	0,00E+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	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	0,00E+00
W	m ³	1,69E-03	5,52E-05	8,42E-08	2,58E-10	3,26E-09	1,52E-08	0,00E+00	0,00E+00

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

Waste

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HW	kg	2,89E-08	3,14E-08	1,42E-12	4,34E-15	1,86E-12	1,60E-12	0,00E+00	0,00E+00
NHW	kg	2,70E-02	4,58E-05	1,43E-06	4,40E-09	2,70E-09	1,04E-08	0,00E+00	0,00E+00
RW	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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

Output flow

Parameter	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
CR	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MR	kg	9,78E-02	0,00E+00	0,00E+00	9,50E-01	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	0,00E+00	0,00E+00	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ETE	MJ	0,00E+00	0,00E+00	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

LCA: Scenarios and additional technical information

The following information describes the scenarios in the different modules of the EPD. The value for distance in the table below is a weighted average, based on the % of production volume from each supplier.

Transport from production place to Swedish port (A4)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance (km)	Fuel consumption (l/tkm)	Value (l/t)
Truck	75% (full trip and 50% return)	Trailer, 24t, EURO5	630	0,32	0,2
Boat	70 %	RoRo	180	0,07	0,01

Note: Figures representative for current situation. The transportation to site scenarios (A4) are only representative of transportation to site in Sweden (Stockholm).

End of Life (C1, C3, C4)

	Unit	Value
Hazardous waste disposed	kg	0
Collected as mixed construction waste	kg	0
Reuse	kg	0
Recycling	ton	1
Energy recovery	kg	0
To landfill	kg	0

Note: Assumed scenario.

Deconstruction, demolition (C1)

Process	Fuel/energy consumption	Type of fuel/energy
Demolition, fragging of steel on site	1,1 kWh/DU	Diesel

Note: The value include demolition and fragging of the rebars on the demilition site bases on Erlandsson and Peterson (2015).

Transport to waste processing (C2)

Type	Capacity utilisation (incl. return) %	Type of vehicle	Distance km	Fuel/Energy consumption	Value (l/t)
Truck	75% full trip and 50% return	Truck, 20t, EURO5	35	0,29	0,02

Note: Assumed value.

Benefits and loads beyond the system boundaries (D)

	Unit	Value
Net flow steel in stage A to C	kg	0

Note: Net flow calculation based on appendix D in EN 15804:2012+A2:2019, based on the scenario where $M_{MR\ out} = M_{MR\ in}$.

Additional Norwegian requirements

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

Poland's 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
Thinkstep database	0,96	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 (Avfallsforskiten, Annex III), see table.

Indoor environment




Not relevant and no tests have therefore been carried out on the product concerning indoor climate.

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>
NPCR 013 2019	<i>NPCR 013 2019 Part B for Steel and Aluminium Construction Products</i>
LCA report	<i>Peñaloza D, Erlandsson, M: LCA report for reinforcement steel. IVL Swedish Environmental Research, 18 November 2019.</i>
Erlandsson and Peterson (2015)	<i>Klimatpåverkan för byggnader med olika energiprestanda. Underlagsrapport till kontrollstation 2015. För Energimyndigheten och Boverket. IVL Svenska Miljöinstitutet, rapport nr U5176, 27 maj 2015, första version daterad 10 maj 2015.</i>

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