

ENVIRONMENTAL PRODUCT DECLARATION

MULTIPLE PRODUCT EPD BASED ON AVERAGE RESULTS

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Owner of declaration	Exmet RSE OÜ
Program operator	The Building Information Foundation RTS sr
Declaration number	RTS_263_23
Publishing date	27.11.2023, revision 15.8.2024
EPD valid until	27.11.2028

HOT-FORMED AND COLD-FORMED REINFORCEMENT STEEL PRODUCTS



EXMET
REINFORCEMENT STEEL



LCA SUPPORT



GENERAL INFORMATION

The EPD owner has the sole ownership, liability, and responsibility for the EPD. Construction products EPDs may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

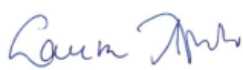
EPDs within the same product category but from different programmes may not be comparable.

EPD program operator

The Building Information Foundation RTS sr
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Valid until

27 November 2028

Product category rules

The CEN standard EN 15804 serves as the core PCR.
In addition, the RTS PCR (English version, 26.8.2020) is used.

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Verification date

26 October 2023
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Independent verification of this EPD and data,
according to ISO 14025:2010:

Internal External

Manufacturer

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Exmet RSE specializes in manufacturing and promoting reinforcement steel – we have a full range of reinforcement products from reinforcement mesh and stirrups to advanced retention systems for windmill foundations. We cut reinforcement parts to any needed size and can bend steel to almost any configuration to fulfil even the most complex orders.

Place of production

Muuga, Estonia

Products

Hot-formed and cold-formed
reinforcement steel products

Declared unit

1 tonne

Mass of declared unit

1000 kg

Data period

2022 and 2024

PRODUCT INFORMATION

Product name	Hot-formed reinforcement steel products (cut and bend reinforcement steel, cut-to-size reinforcement steel, column frames reinforcement assembly, rebundled streight reinforcement steel) Cold-formed reinforcement steel products (welded mesh, welded/bended mesh, cut and bend reinforcements, cold rolled coils, rebundled streight reinforcement steel)
Place of production	Muuga, Estonia

PRODUCT DESCRIPTION AND APPLICATION

Hot-formed reinforcement steel products

Cut and bend reinforcements, specific reinforcenets according to customer drawings and specifications. Different sizes and shapes, incl. bent and 3D, radial and spiral bending of reinforcement steel for foundations and major infrastructure projects.

The products are used as reinforcements of load-bearing concrete structures.

Cold-formed reinforcement steel products

Welded standard and special sized meshes, bended meshes. Cut and bend reinforcements, specific reinforcenets according to customer drawings and specifications.

The products are used as reinforcements of load-bearing concrete structures.

TECHNICAL SPECIFICATIONS AND PRODUCT STANDARDS

Hot-formed reinforcement steel products

Cut and bend reinforcement steel and reinforcement steel with a diameter of 8-32 mm. Column frames reinforcement assembly max diameter 1500, lenght max 12m. Rebundled streight reinforcement steel 100kgx10pcs=1t lenght 6m
Material class B500B

Cold-formed reinforcement steel products

Different sizes and shapes, including bent and 3D, radial and spiral bending of reinforcement steel. Standard cold rolled coils weight up to 3 tonns. Rebundled streight reinforcement steel 100kgx10pcs=1t lenght 6m

Material class B500A

We are certified according to the next certificates: TR 392:2018, SFS 1267:2008, EN 10080:2005+SS212540:214, NS 3576-1:2005+NS 3576-4:2005, SFS 1300:2020

PRODUCT RAW MATERIAL COMPOSITION PER DECLARED UNIT

Raw material category	Amount, mass-% and material origin*
Metals (steel, B500B or B500A)	100%, Europe
Minerals	-
Fossil materials	-
Bio-based materials	-
Total	100%

* Order of magnitude, not exact composition

Origin groups of materials	Amount (kg) per declared unit	Additional information
Renewable materials		-
Non-renewable materials		-
Recycled materials	810-820	From Europe
Re-used, remanufactured products		-
Dangerous substances		Not contained in the product
Total		100%

The products do not contain biogenic carbon. The packaging does contain some biogenic carbon.

Biogenic carbon content in product	0 kg
Biogenic carbon content in packaging	2.2 kg

Note. 1 kg biogenic carbon is equivalent to 44/12 kg of biogenic CO₂.

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0.1 % (1000 ppm).

MANUFACTURING PROCESS

Exmet RSE's certified production process meets the strictest requirements of the metal industry, and quality management ensures the highest possible quality for the customer. When materials arrive at the Exmet RSE OÜ factory, materials are inspected and stored indoors. We test our products daily at our in-house laboratory. Our warehouse staff are qualified, and we can provide high quality packaging and fast transport to the end user destination with our own fleet of trucks. We have a fully automated production line for standard and special meshes, fully automated cut & bend benches for the production of components, automated reinforcement cutting and bending line for a diameter of up to 20 mm, automated reinforcement cutting and bending line for a diameter of up to 45 mm, radial bending of reinforcement for wind turbine foundations and other large-scale infrastructure projects. Production of stirrups with a diameter of 6-12 mm.

Figure 1. Manufacturing process



PRODUCT LIFE-CYCLE AND LIFE-CYCLE ASSESSMENT

Period for data	2022 and 2024 The EPD was first published in 2023 based on 2022 data. It was updated in 2024 to reflect the changes in suppliers.
Declared unit	1 tonne
Mass per declared unit	1000 kg
Mass of packaging	6.6 kg

The declared product is a weighted average of various hot-formed and cold-formed reinforcement steel products. The variation (GWP-fossil) between the hot-formed and cold-formed products is ±3%.

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and the applied PCR. The study does not exclude any hazardous materials or substances.

The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

Co-product allocation has not been used.

The data sources for the study are Ecoinvent 3.8 (2021) and One Click LCA databases. The tools used for the study were One Click LCA and Open LCA. The EN 15804 reference package used is based on EF 3.0.

SYSTEM BOUNDARY

The scope of the EPD is cradle to gate with options (A1-A4), modules C1-C4 and module D.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
x	x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x	x	x
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials.

Vehicle capacity utilization volume factor is assumed to be 1, which means full load. In reality, it may vary but as role of transportation emission in total results is small and so the variety in load is assumed to be negligible. Empty returns are not taken into account as it is assumed that return trip is used by transportation company to serve the needs of other clients.

Fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. All fuel and energy use was allocated based on production volume. The electricity used in the plant is grid energy and this has been modelled based on Estonian residual mix for 2020-2022. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

The products are packaged using packaging timber and pallets. In addition, protective covers, belts etc. are used. The packaging does contain biogenic carbon but no carbon sequestration has been assumed.

Electricity data source and quality	Modelled electricity based on Estonian residual mix for 2020-2022
Specific emissions	0.64 kg CO ₂ e/kWh
Heating data source and quality	Heat production, natural gas, at industrial furnace >100kW (Reference product: heat, district or industrial, natural gas). Source: Ecoinvent 3.8, Europe. Unit: MJ
Specific emissions	0.071 kg CO ₂ e/MJ

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

The transportation distance is defined according to RTS PCR - from the place of manufacture to Helsinki, Finland. According to the manufacturer, transportation doesn't cause losses as products are packaged properly. The final product is transported 105 km (30 km by lorry and 75 km ferry). Vehicle capacity utilization volume factor is assumed to be 1.

Vehicle type used for transport and distance	105 km (30 km by lorry and 75 km ferry)
Specific transport emissions	0.10 kg CO ₂ per tkm
Capacity utilisation (including empty returns)	100%
Density	7850 kg/m ³
Volume capacity utilisation factor	1

A5 has not been declared.

PRODUCT USE AND MAINTENANCE (B1-B7)

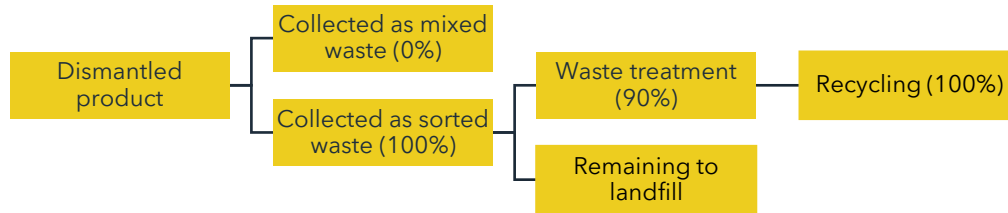
This EPD does not cover the use phase.

Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

It is assumed that 100% of products are collected at demolition site. It is assumed that the dismantled product is transported 100 km by lorry (either to recycling facilities or landfill). Based on EuRIC data, 90% of steel is assumed to be sent to recycling and later used as input in steelmaking. All waste that is not recycled gets landfilled. The EOL scenarios are applicable to Europe.

Figure 2. EOL scenarios



Any material that left the product system in C3 has been considered in module D. Only net benefits are considered. The collection and recycling rate is assumed as 90%. It is assumed the scrap steel is melted to produce new steel products.

Collection	Collected separately	1000 kg
	Collected with mixed waste	0 kg
Recovery	Re-use	0 kg
	Recycling	900 kg
	Energy recovery	0 kg
Disposal	Final deposition	100 kg
	Scenario assumptions e.g. transportation	Dismantled product is transported 100 km

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VERSION HISTORY

Previously published EPDs RTS_262_23 for cold-formed reinforcement products and RTS_263_23 for hot-formed reinforcement products have been compiled into one EPD. The updated EPD declares the results of the averaged product. Modules A1, A2 and D have been reworked to reflect the changes in suppliers. Module A3 and A4 have been partially reworked (packaging and waste) to reflect the averaged product. Modules C1, C2, C3 and C4 have not been changed.

HOT-FORMED AND COLD-FORMED REINFORCEMENT STEEL PRODUCTS (1 tonne)

ENVIRONMENTAL IMPACTS - CORE INDICATORS, EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential - total	kg CO2e	4.08E+02	1.11E+01	3.25E-01	1.71E+01	1.97E+01	6.60E+00	-1.45E+02
Global warming potential - fossil	kg CO2e	4.07E+02	1.11E+01	2.90E-01	1.70E+01	1.97E+01	6.60E+00	-1.45E+02
Global warming potential - biogenic	kg CO2e	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Global warming potential - LULUC	kg CO2e	8.64E-01	6.43E-03	6.70E-04	6.50E-03	2.61E-02	2.70E-03	-2.25E-02
Ozone depletion pot.	kg CFC-11e	2.10E-05	2.33E-06	1.50E-08	3.80E-06	2.43E-06	1.50E-06	-5.58E-06
Acidification potential	mol H+e	1.90E+00	2.83E-01	1.60E-03	6.70E-02	2.52E-01	6.70E-02	-5.85E-01
Eutrophication potential - freshwater	kg Pe	1.51E-03	4.59E-05	3.00E-05	1.20E-04	1.08E-03	2.90E-05	-5.94E-03
Eutrophication potential - marine	kg Ne	4.43E-01	7.13E-02	2.20E-04	2.00E-02	5.31E-02	2.90E-02	-1.23E-01
Eutrophication potential - terrestrial	mol Ne	2.41E+00	7.94E-01	2.50E-03	2.20E-01	6.12E-01	3.20E-01	-1.45E+00
Photochemical ozone formation ("smog")	kg NMVOCe	1.73E+00	2.09E-01	7.10E-04	6.80E-02	1.71E-01	8.70E-02	-7.20E-01
Abiotic depletion potential - minerals & metals	kg Sbe	2.90E+04	1.69E-05	8.00E-07	5.90E-05	2.61E-03	5.30E-06	-2.74E-03
Abiotic depletion potential - fossil resources	MJ	5.97E+03	1.46E+02	6.16E+00	2.47E+02	2.67E+02	9.60E+01	-1.26E+03
Water use	m3e depr.	1.95E+02	4.80E-01	1.60E-01	1.10E+00	5.18E+00	3.10E-01	-2.61E+01

EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renewable primary energy resources as energy	MJ	8.40E+02	1.21E+00	1.06E+00	3.50E+00	4.74E+01	6.70E-01	-1.05E+02
Renewable primary energy resources as material	MJ	7.03E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources	MJ	9.10E+02	1.21E+00	1.06E+00	3.50E+00	4.74E+01	6.70E-01	-1.05E+02
Non-renewable primary energy resources as energy	MJ	1.25E+03	1.46E+02	6.16E+00	2.47E+02	2.67E+02	9.60E+01	-1.26E+03
Non-renewable primary energy resources as material	MJ	6.26E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources	MJ	7.51E+03	1.46E+02	6.16E+00	2.47E+02	2.67E+02	9.60E+01	-1.26E+03
Secondary materials	kg	1.17E+03	5.48E-02	3.40E-03	8.30E-02	2.97E-01	3.70E-02	9.00E+01
Renewable secondary fuels	MJ	2.19E+00	2.26E-04	3.70E-06	9.10E-04	1.53E-02	2.00E-04	-1.35E-02
Non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m3	4.43E+00	1.16E-02	5.10E-03	3.10E-02	1.53E-01	2.10E-02	-2.97E-01

PER = Primary energy resources

END OF LIFE - WASTE

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	2.11E+00	1.74E-01	2.40E-02	2.80E-01	1.82E+00	1.30E-01	-4.86E+01
Non-hazardous waste	kg	9.67E+01	1.84E+00	1.38E+00	4.90E+00	5.79E+01	2.10E+00	-2.37E+02
Radioactive waste	kg	2.67E-02	1.03E-03	4.40E-05	1.70E-03	1.53E-03	6.70E-04	4.50E-04

END OF LIFE - OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	1.37E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	4.14E+01	0.00E+00	0.00E+00	0.00E+00	9.00E+02	0.00E+00	0.00E+00
Materials for energy recovery	kg	2.05E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

KEY INFORMATION PER KG OF PRODUCT

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential - total	kg CO2e	4.08E-01	1.11E-02	3.25E-04	1.71E-02	1.97E-02	6.60E-03	-1.45E-01
Global warming potential - fossil	kg CO2e	4.07E-01	1.11E-02	2.90E-04	1.70E-02	1.97E-02	6.60E-03	-1.45E-01
Global warming potential - biogenic	kg CO2e	9.09E-05	1.17E-05	3.40E-05	5.70E-05	-5.22E-05	1.60E-06	-2.70E-05
Abiotic depletion potential - minerals & metals	kg Sbe	2.90E-07	1.69E-08	8.00E-10	5.90E-08	2.61E-06	5.30E-09	-2.74E-06
Abiotic depletion potential - fossil	MJ	5.97E+00	1.46E-01	6.16E-03	2.47E-01	2.67E-01	9.60E-02	-1.26E+00
Water use	m3e depr.	1.95E-01	4.80E-04	1.60E-04	1.10E-03	5.18E-03	3.10E-04	-2.61E-02
Secondary materials	kg	1.17E+00	5.48E-05	3.40E-06	8.30E-05	2.97E-04	3.70E-05	9.00E-02
Biogenic carbon in product (A3)	kg C	0.00E+00	N/A	N/A	N/A	N/A	N/A	N/A
Biogenic carbon in packaging (A3)	kg C	2.22E-03	N/A	N/A	N/A	N/A	N/A	N/A