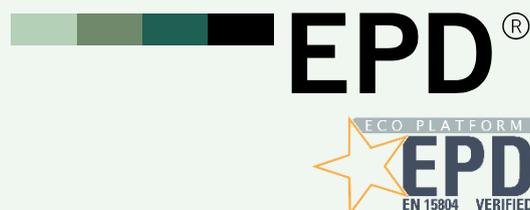


Environmental Product Declaration



In accordance with ISO 14025 and EN 15804:2012+A1:2013 for:

Steel reinforcement products - Danish sites

from

Lemvigh-Müller



Programme:	The International EPD® System, www.environdec.com
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Programme information

Programme:	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com
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CEN standard EN 15804:2012+A1:2013 served as the core PCR
Product category rules (PCR): PCR 2012:01 Construction products and construction services, version 2.33
PCR review was conducted by: The Technical Committee of the International EPD® System. Chair: Massimo Marino. Contact via info@environdec.com
Independent third-party verification of the declaration and data, according to ISO 14025:2006: <input type="checkbox"/> EPD process certification <input checked="" type="checkbox"/> EPD verification
Third party verifier: Håkan Stripple, IVL Swedish Environmental Research Institute P.O. Box 53021, SE-400 14 Gothenburg, Sweden Tel. IVL +46 (0)10-788 65 00 e-mail: Hakan.Stripple@IVL.se 
Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804:2012+A1:2013.

Company information

Lemvigh-Müller is Denmark's largest wholesaler of steel and technical products. The company offers the market's widest range of steel, stainless steel and other metals to companies large and small in the construction and industrial sectors. Lemvigh-Müller works with leading steel suppliers in Europe and the rest of the world. However, our hands are not tied. As an independent partner, we are free to choose the steelworks that best meets our customers' needs, wishes and requirements. Lemvigh-Müller is the only steel wholesaler in Denmark that has in-house specialists within all special steel types. We can therefore offer competent guidance and advice on products, materials, dimensions, processing and steelworks.

At our central warehouse at Randers in Denmark, Lemvigh-Müller stocks more than 3,700 SKUs within black steel, stainless steel and other metals. We offer day-to-day delivery on all of these. Via a comprehensive partnership network, our company can also offer competitive procurement packages that give our customers rapid access to more than 13,000 steel products.

Lemvigh-Müller also offers steel processing. We are at your disposal if you wish us to assist in your manufacturing or construction process. We are the only wholesaler in Denmark that offers steel drilling, saw cutting, priming, shot blasting, shearing and slitting. Lemvigh-Müller's own manufacturing centres at Køge in Denmark and Swinoujście in Poland process reinforcing steel. Lemvigh-Müller meets ISO 9001, ISO 1090 and ISO 3843 norms and standards.

With regard in particular to the company's steel customers, Lemvigh-Müller offers the aGreenment™ partnership scheme that focuses on sustainability. As an aGreenment™ partner, the customer receives steel deliveries on an agreed weekly delivery day or days. The scheme allows Lemvigh-Müller to optimise road transport and thus save on fuel – and reduce CO₂ emissions.

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Product information

Product name: Steel reinforcement products

Product description: Reinforcement steel supplied from Lemvigh-Müller's facilities in Denmark.

Product identification:

Material Standards: DS/EN 10080 and EC2, SS/EN 10080 and SS212540.

UN CPC code: 41241 and 41242

Geographical scope: Denmark

LCA information

The underlying Life Cycle Assessment (LCA) is a cradle-to-gate assessment that has been conducted in accordance with ISO 14040 and ISO 14044. The study is also performed according to PCR 2012:01 Construction products and construction services, version 2.33, EN15804:2012+A1:2013 and General Programme Instructions for the international EPD® System, version 2.5.

Declared unit: 1 metric tonne reinforcement steel delivered to customer from Lemvigh-Müller's warehouses in Denmark.

Reference service life: Not applicable for an A1-A4 assessment.

Time representativeness: The specific data for Lemvigh-Müller has been collected for the calendar year 2020. Background data are less than 10 years old.

Database and LCA software used: Modelling and environmental impact calculations are performed with the LCA software GaBi (version 10.0.1.92), using life cycle inventory data from supplier specific EPDs, GaBi Professional database 2021, GaBi Extension database XIV: construction materials 2020 and Ecoinvent 3.6.

System boundaries:

The LCA is a cradle-to-gate assessment covering the modules A1-A4.

X = Included MND = Module Not Declared

Production stage			Construction process stage		Use stage							End-of-life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport	Construction	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

Figure 1. Description of the modules covered in the EPD.

Figure 2 below is a simplified process tree with system boundaries where all instances of the figure are included in the assessment. Excluded are thus; infrastructure, construction, production equipment and tools that are not directly consumed in the production process, travelling by personnel and research and development – all in accordance with the PCR.

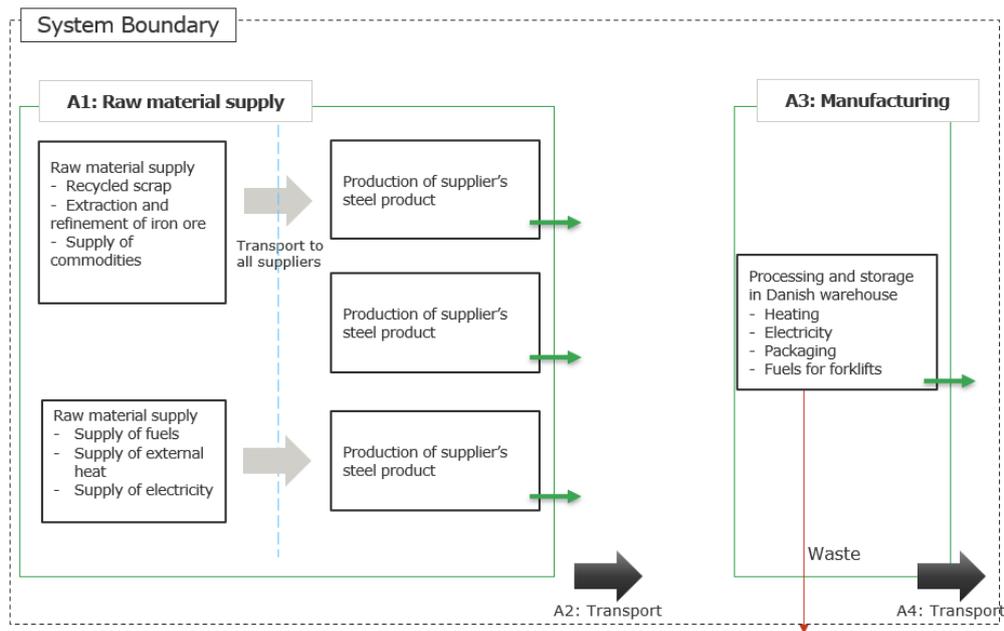


Figure 2. Simplified process tree.

The lifecycle is divided into the following modules:

Module A1

The upstream processes in A1 comprises the production of the reinforcement products at Lemvigh-Müller's suppliers. These have to a large extent been modelled with EPDs for the specific product and supplier in question. Generic LCA data were used where supplier specific EPDs were lacking. The module also includes the production of purchased electricity, district heating and diesel fuel used at Lemvigh-Müller's facilities.

Module A2

The upstream process in module A2 comprises impacts from transportation of the products to Lemvigh-Müller's facilities in Denmark.

Module A3

The core process, module A3, includes storage and processing of the final products, use of fuels on site, as well as transport of waste that has reached the end-of-waste state generated at the warehouse (i.e. scrap from processing).

Module A4

The downstream process in module A4 comprises impacts from transportation of the products from Lemvigh-Müller's facilities to clients primarily in Denmark. The transport is conducted with trucks, Euro 6, and the environmental impact is calculated based on the fuel consumption during the assessed period.

Cut-off and allocation principles:

Several products are sold from the sites and the environmental impact at the site (energy and resource use and generation of waste) have been allocated to the production based on weight.

In case of recycling or other recovery of generated waste, impacts are borne by the product until it enters the facility gate where the process takes place in accordance with the Polluter Pays Principle. The same method is applied for incoming raw materials of recycled origin, where the product carries the processes required to produce the raw materials from the recycled material, but not the upstream production of the virgin material.

All major raw materials and all the essential energy is included. The requirement that a minimum of 95 % of the total inflows (mass and energy) shall be included is fulfilled.

Content declaration

Product

The products consist of 100% steel.

The products does not contain any of the substances listed on the “Candidate List of Substances of Very High Concern (SVHC) for authorisation”

(http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp).

Packaging

The products are bundled together with lifting straps for secure handling during logistics.

Recycled material

The product consists of a high degree of recycled steel. The suppliers of Lemvigh-Müller produce the steel in the Electric Arc Furnace route.

Environmental performance

Potential environmental impact

ENVIRONMENTAL IMPACTS PER [1 TONNE STEEL REINFORCEMENT PRODUCTS DELIVERED TO CUSTOMER FROM LEMVIGH-MÜLLER'S WAREHOUSE]			
Parameter	Unit	A1-A3	A4
GWP	[kg CO ₂ -eq.]	7.73E+02	2.48E+01
ODP	[kg CFC11-eq.]	7.18E-05	6.66E-15
AP	[kg SO ₂ -eq.]	3.33E+00	1.98E-02
EP	[kg PO ₄ ³⁻ -eq.]	4.38E-01	3.88E-03
POCP	[kg ethene-eq.]	4.24E-01	-2.58E-04
ADPE	[kg Sb-eq.]	1.05E-02	2.25E-06
ADPF	[MJ]	8.32E+03	3.33E+02
Caption	GWP = Global warming potential; ODP = Ozone depletion potential; AP = Acidification potential of soil and water; EP = Eutrophication potential; POCP = Photochemical ozone creation potential; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources		

Use of resources

RESOURCE USE PER [1 TONNE STEEL REINFORCEMENT PRODUCTS DELIVERED TO CUSTOMER FROM LEMVIGH-MÜLLER'S WAREHOUSE]			
Parameter	Unit	A1-A3	A4
PERE	[MJ]	2.47E+03	1.94E+01
PERM	[MJ]	1.25E+00	0.00E+00
PERT	[MJ]	2.47E+03	1.94E+01
PENRE	[MJ]	9.01E+03	3.38E+02
PENRM	[MJ]	2.66E+01	0.00E+00
PENRT	[MJ]	9.03E+03	3.38E+02
SM	[kg]	9.81E+02	0.00E+00
RSF	[MJ]	1.20E-01	0.00E+00
NRSF	[MJ]	4.03E+02	0.00E+00
FW	[m ³]	2.00E+01	2.22E-02
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Net use of fresh water		

Waste production and output flows

Waste production and Output flows

WASTE CATEGORIES AND OUTPUT FLOWS PER [1 TONNE STEEL REINFORCEMENT PRODUCTS DELIVERED TO CUSTOMER FROM LEMVIGH-MÜLLER'S WAREHOUSE]			
Parameter	Unit	A1-A3	A4
HWD	[kg]	1.82E+00	1.78E-08
NHWD	[kg]	5.62E+02	5.30E-02
RWD	[kg]	1.27E-01	6.13E-04
CRU	[kg]	0.00E+00	0.00E+00
MFR	[kg]	1.18E+01	0.00E+00
MER	[kg]	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00
Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy		

References

PCR 2012:01 Construction products and construction services, version 2.33

EN15804:2012+A1:2013 *Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products*

General Programme Instructions of the International EPD[®] System. Version 2.5.

ISO 14025:2010 on Type III Environmental declarations.

ISO 14040:2006 and ISO 14044:2006 on Life Cycle Assessments (LCA).

Tollin, S., and Silfverstrand, N. 2021. LCA report for Lemvigh-Müller steel reinforcement products, Ramboll, 2021

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