Environmental Product Declaration

In accordance with ISO 14025 and EN 15804 for:

LLENTAB Core Steel

from

LLENTAB AB

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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

Product category rules (PCR): *PCR 2012:01 Construction products and construction services (EN 15804:A1). Version 2.3, 2018-11-15*
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: ☐ EPD process certification ☒ EPD verification
Third party verifier: Pär Lindman, Miljögiraff    Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ 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.

Company information

Owner of the EPD:
LLENTAB AB
E-mail: info@llentab.se
Telephone: 46(0)52379000
Address: Box 104, 456 23 Kungshamn, Sweden

Description of the organisation:
Llentab conducts sales, design, manufacturing and assembly of steel halls of different sizes, structures, roof slopes, insulation, fire resistance and colour combinations. The production units in Sweden and Poland produce core steel consisting of pillars, trusses and steel profiles. Llentab conducts operations in Sweden, Norway, Poland, the Czech Republic, Slovakia and Ukraine. The headquarters as well as the main production site is located in Kungshamn (Sweden).

Product-related or management system-related certifications:
Llentab has a process-oriented integrated management system "LLENTAB Inside". The operating system is designed to conform in its structure with the standards ISO 9001, 14001 and 45001.

The company is affiliated to FTI, a national system for packaging material disposal.

Names and locations of production sites:
Sweden: LLENTAB AB, Hallindenvägen 28-29, 456 34 Kungshamn
Poland: LLENTAB sp. z o.o., ul. Budowlanych 8, 80-298 Gdańsk

Product information

Product name:
LLENTAB Core Steel

Product identification:
The product complies with the technical standard EN 10346:2015.

UN CPC code:
421 Structural metal products and parts thereof

Product description:
This EPD covers core steel products in the form of pillars, trusses and steel profiles. Llentab uses steel profiles with thicknesses from 1.5 up to 7 mm. High-strength steel is used for all profiles up to a thickness of 7 mm.

Our profiles are produced from hot-dip galvanised steel delivered to us in coils. For thinner profiles (up to 2 mm), a Z275 layer is used, while for the rest Z450 is standard. Profiles are roll-formed or bent into a variety of sizes and the shapes are Z (mainly for purlins and wall racks), C (for trusses, pillars and frame elements) and Ω (for the top and bottom flanges of the frame).

The product density is 7,825 kg/m^3. Expected service life depends on the application and the surrounding environment.

Geographical scope: Europe

LCA information

Declared unit:
1 kg core steel

Time representativeness:
The production data covers the production during 2018. The database data are from 2014-2019.

Database(s) and LCA software used:
The LCA software GaBi 8 was used for modelling and the databases provided by Thinkstep AG (2018) and Ecoinvent version 3 were the primary source of data sets.

Description of system boundaries:
This study is done according to *cradle-to-gate with options* and includes the life cycle stages *raw material supply* (A1), *transport to manufacturing* (A2), *manufacturing* (A3) and *transport to the building site* (A4).

Excluded lifecycle stages:
The life cycle stages excluded from this study are *installation* (A5), the *use stage* (B1-B7), the *end-of-life stage* (C1-C4) and *benefits and loads beyond the system boundary* (D).

More information:
LCA practitioner
This Environmental Product Declaration (EPD) has been carried out by IVL Swedish Environmental Research Institute. This EPD is in accordance with ISO 14025 and EN 15804. It is a third party externally verified document that reports environmental data of products based on Life Cycle Assessment (LCA) and other relevant information.

Allocation
Along with the core steel products, the factories produce by-products in the form of bricks. For both sites, a conservative approach is applied and the environmental burden is allocated to the main products, since those are the purpose of the production, and none to the by-products.

Cut-off criteria and key assumptions
Close to 100% of all material and energy flows have been included in the model calculations. The study applies a cut-off criterion of maximum 1%, which complies with the maximum cut-off criteria established by the PCR and EN 15804 standard.

Other relevant assumptions for the study are:

- The transport from the production site to the customer were weighted based on the primary customers and their share of the market
- Manufacturing of equipment and infrastructure were not included
- No direct emissions from the production sites were reported

Data quality
Concerning the relevance of the data in the study, all data for module A3 has been collected directly from the production sites and is representative for the year 2018. For modules A1, A2 and A4, some of the data are modelled using supplier specific EPDs. In cases where no supplier specific data was available, suitable generic data has been used.

Additional information
For more information about the production, please visit www.llentab.se.

System diagram:

The life cycle stages included in the analysis are illustrated according to EN15804 in the table below. If a stage is included, it is indicated with ”X” and if it is not included ”MND” (Module Not Declared) is noted.

Table 1. Life cycle stages included in the LCA study.

Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
Raw material	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction, demolition	Transport	Waste processing	Disposal	Reuse, recycling or energy recovery potentials
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

Flow chart:

A flow chart illustrating the life cycle stages and processes included is presented in the figure below.

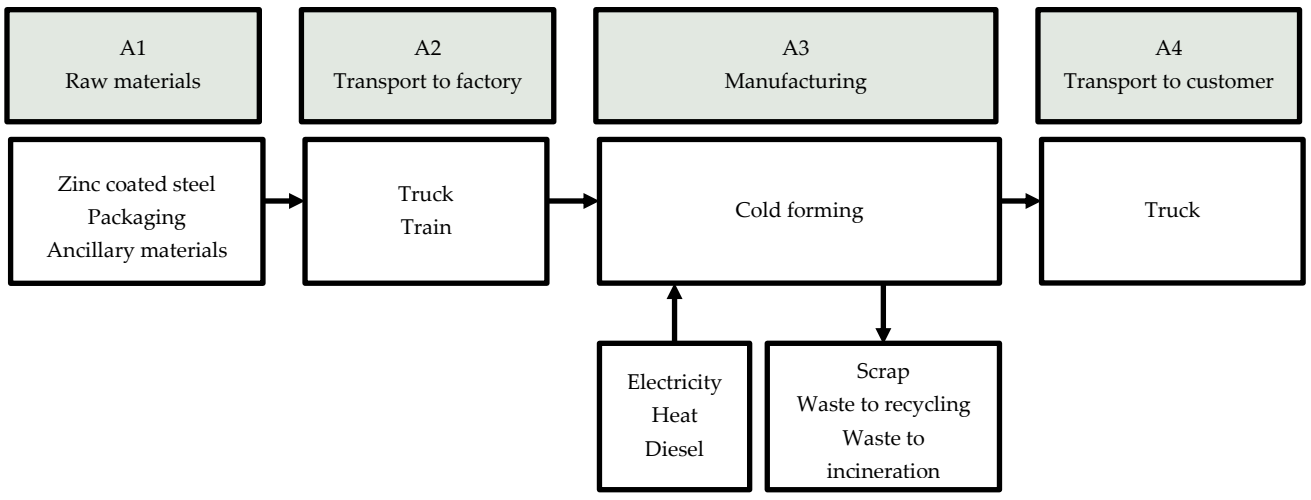

Figure 1. Flow chart illustrating the life cycle stages and processes included in the LCA study.

Content declaration

Product

For construction product EPDs compliant with EN 15804, the content declaration shall list, as a minimum, substances contained in the products that are listed in the “Candidate List of Substances of Very High Concern for Authorisation” when their content exceeds the limits for registration with the European Chemicals Agency. No substances occur on the REACH candidate list of SVHC (Candidate List of Substances of Very High Concern) in the products of this EPD.

Packaging

The final product does not require packaging.

Recycled material

Provenience of recycled materials in the product:

The steel raw material manufacturing generally includes a certain amount of steel scrap in the production process. Since supplier-specific information is not available for all suppliers, the exact amount of recycled material in the final product is not known. However, the parameter “Use of secondary material” has been quantified based on the raw material data sets used in this LCA study. The parameter indicates that 0,08 kg steel scrap is used to produce 1 kg core steel product.

Scenario for module A4

The table below presents the details on the scenario used to model the transport of the product to the customers. The amounts and distances are based on the situation in 2018. Part of the products produced in Gdansk is transported to Kungshamn. This transport is included as well as the final transportation of products to the Swedish and Polish markets.

Table 2. Details on scenario for A4 Transport to customers.

Transport	Vehicle type	Vehicle load capacity	Distance (km)	Load factor (%)	Amount transported (share of total production) (%)
Transport of components from Gdansk to Kungshamn	Diesel truck, Euro class 4, 20-26 t gross weight	17 t payload capacity	500	80	7,7
	Boat, RoRo	N/A	320	N/A	
Transport to customers from Kungshamn (Swedish market)	Diesel truck, Euro class 5, 34-40 t gross weight	27 t payload capacity	370	85	68
Transport to customers from Gdansk (Polish market)	Diesel truck, Euro class 4, 20-26 t gross weight	17 t payload capacity	500	85	32

Environmental performance

Potential environmental impact

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4
Global warming potential (GWP)	kg CO_2 eq.	2,55	4,06E-02	1,87E-02	2,61	2,51E-02
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.	-7,24E-09	4,11E-16	1,20E-11	-7,23E-09	4,13E-18
Acidification potential (AP)	kg SO_2 eq.	5,87E-03	9,22E-05	5,93E-05	6,02E-03	9,14E-05
Eutrophication potential (EP)	kg PO_4^{3-} eq.	5,57E-04	1,68E-05	5,82E-06	5,80E-04	2,26E-05
Formation potential of tropospheric ozone (POCP)	kg C_2H_4 eq.	8,86E-04	-1,46E-05	4,51E-06	8,76E-04	-2,66E-05
Abiotic depletion potential – Elements	kg Sb eq.	3,50E-05	6,15E-09	3,39E-09	3,50E-05	1,75E-09
Abiotic depletion potential – Fossil resources	MJ, net calorific value	26,1	0,509	0,211	26,8	0,342

Use of resources

PARAMETER		UNIT	A1	A2	A3	TOTAL A1-A3	A4
Primary energy resources – Renewable	Use as energy carrier	MJ, net calorific value	0,996	0,126	0,158	1,28	1,91E-02
	Used as raw materials	MJ, net calorific value	0	0	0	0	0
	TOTAL	MJ, net calorific value	0,996	0,126	0,158	1,28	1,91E-02
Primary energy resources – Non-renewable	Use as energy carrier	MJ, net calorific value	26,8	0,617	0,313	27,7	0,343
	Used as raw materials	MJ, net calorific value	0	0	0	0	0
	TOTAL	MJ, net calorific value	26,8	0,617	0,313	27,7	0,343
Secondary material		kg	8,15E-02	0	4,30E-05	8,15E-02	0
Renewable secondary fuels		MJ, net calorific value	0	0	0	0	0
Non-renewable secondary fuels		MJ, net calorific value	0	0	0	0	0
Net use of fresh water		m^3	3,78E-03	1,59E-04	2,42E-04	4,18E-03	3,23E-05

Waste production and output flows

Waste production

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4
Hazardous waste disposed	kg	9,68E-03	1,99E-08	1,46E-09	9,68E-03	1,84E-08
Non-hazardous waste disposed	kg	9,83E-02	2,20E-04	2,83E-04	9,88E-02	2,68E-05
Radioactive waste disposed	kg	6,69E-05	4,27E-05	4,23E-05	1,52E-04	4,63E-07

Additional information

Recycling

Llentab's use of high strength steels reduces the total amount of material used in the framework significantly, without affecting the strength of the design. Steel itself is 100% recyclable and assembly of the framework with screws and nuts enables, dismantling, reconstruction and extension without need for demolition of the framework.

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