Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Load bearing steel structures

from Hustal UAB

Programme:	The International EPD® System, www.environdec.com
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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804:2012 + A2 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): Construction products 2019:14 Version 1.3.1 2023-07-08
UN CPC code: 421
PCR review was conducted by: Martin Erlandsson, IVL Swedish Environmental Research Institute, martin.erlandsson@ivl.se
Life Cycle Assessment (LCA)
LCA accountability: *Sigita Židonienė, PhD., Vesta Consulting www.vestaconsulting.lt*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: *Anni Oviir, Rangi Maja OÜ www.lcasupport.com* 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 registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data and etc. For further information about comparability, see EN 15804 and ISO 1402

Company information

Owner of the EPD:
Hustal UAB
Adress: Tinklų g. 7, LT-35115 Panevėžys, Lithuania
Email: info@hustal.eu
Webpage: www.hustal.eu

Description of the organization: HUSTAL UAB specializes in supply of load bearing steel structures for construction projects mainly in Scandinavian market. Knowledge and experience in the industry assures professional solutions and deliveries without compromise. Highest priority is the quality of product and services.

Product-related or management system-related certifications: The manufactured steel structures comply with the requirements of the European Union (EU), health and environmental protection regulations and are marked with the CE mark. The company is certified according to ISO 9001, ISO 14001 and ISO 45001 standards. The manufacturing process of the product is certified and complies with the following EU regulations:

- EN 1090-1:2009+A1:2011, execution class up to EXC3 according to EN 1090-2:2018, groups of materials 1,2 and 3 according to CEN ISO/TR 15608:2017, welding processes 135, 136 and 138 according to EN ISO 4063:2010, insert parts according to EN ISO 17660-1:2006, covered by anti-corrosion coatings.
- EN ISO 3834-2:2021 manufacturing of various metal constructions, items and components, when used certified welding processes.
- EN ISO 17660-1:2006, EN ISO 17660-1/P:2008 welding of reinforcing steel.

Name and location of production site(s): Panevėžys, Lithuania

Product information

Product name: Load bearing steel structures, such as columns, beams, trusses, welded from plate HSQ (WQ) beams, braces, etc. This EPD represents the simple average of production.

Product description: Steel structures produced from carbon steel by means of cutting and welding with surface treatment afterwards. Structures supplied for erection on building site primed, painted or hot dip galvanized. Steel structures include components such as trusses, columns, beams, HSQ (WQ) beams, braces. The structures are made of unalloyed or low-alloyed steel, and they are used as building components in the construction industry. The results in this EPD represent the simple average of production. The market area is Nordic countries.

Technical characteristics: Material grades used are S335, S420. Dimensions of the products vary based on specific project requirements. More about products could be found www.hustal.eu.

UN CPC code: 421

Geographical scope: Europe

LCA information

Declared unit: 1 kg of product.

Reference service life: The service life is the same as for the building, and it is usually set at 60 years.

Time representativeness: Primary data was collected internally. The production data refers to the average for the year of 2022.

Database(s) and LCA software used: The Ecoinvent database v.3.6 provides the life cycle inventory data for the raw and process materials obtained from the background system. The LCA software used is One Click LCA. Specific raw materials EPDs are used.

Description of system boundaries: Cradle to gate with options, modules C1–C4, module D.

Modules declared, geographical scope, the share of specific data (in GWP-GHG results) and data variation:

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X
Geography	EU	EU	LT	EU	-	-	-	-	-	-	-	-	EU	EU	EU	EU	EU
Specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	<10%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Not relevant					-	-	-	-	-	-	-	-	-	-	-	-

Description of the system boundary (X = Included in LCA; MND = Module Not declared)

Data quality: The foreground data collected internally is based on yearly production amounts and extrapolations of measurements on specific machines and plants. Overall, the data quality can be described as good. The primary data collection has been done thoroughly.

Cut-off criteria: Life cycle inventory data for a minimum of 99% of total material and energy input flows have been included in the life cycle analysis. However, only materials having in summa less than 1% of the weight of the product were not used in calculations.

Product stage:

A1: This stage considers the extraction and processing of raw materials and energy consumption.

A2: The raw materials are transported to the manufacturing plant. In this case, the model includes road transportation of each raw material.

A3: This stage includes the manufacture of products and packaging. It also considers the energy consumption and waste generated at the production plant.

Production process description

The products' manufacturing process is described in the picture below.

Construction process stage:

A4: This stage includes transportation from the production gate to the construction site where the product shall be installed. Transportation is calculated based on data form manufacturer and a scenario with the parameters described in the following table.

Parameter	Value/Description
Vehicle type used for transport	EURO 5 and EURO 6 truck with a trailer with an average load of >32t; Freight sea, ferry.
Distance	100 % of production: Truck – 773 km. Ferry – 286 km
Capacity utilization	100 % of the capacity in volume (truck) 100 % of the capacity in volume (ferry)

A5: module not declared.

Use stage: not declared.

End of Life stage:

C1: This stage includes product deconstruction, dismantling, and demolition. Consumption of fuel in the demolition process is calculated according to transported mass. Energy consumption for demolition is assumed to be 0,01 MJ for 1 kg (Bozdağ, Ö & Seçer, M (2007) and the Level(s) project). The source of energy is diesel fuel used by construction machinery.

C2: Transport of the discarded product to the processing site. It is estimated that there is no mass loss during the use of the product, therefore, the end-of-life product is assumed that it has the same weight as the declared product. All the end-of-life product is assumed to be sent to the closest facilities, such as recycling. Transportation distance to the closest disposal area is estimated as 50 km and the transportation method is lorry which is the most common.

C3: Waste processing for reuse, recovery and/or recycling. Based on European average 97% of steel are transformed into secondary material in a recycling plant without any quality loss.

C4: Discharge (disposal). It is assumed that rest 3% of steel is landfilled.

Benefits and loads beyond the system boundary (D):

Benefits of recyclable waste generated in the phase C3 are considered in the phase D. The recycled steel has been modelled to avoid use of primary materials. The scrap content in the studied product has been acknowledged and only the mass of primary steel in the product provides the benefit to avoid double counting.

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Steel	0,99	64	0
Primer and paints	<0,01	0	0
TOTAL	1	63	0
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
Wood	0,018	1,8	
Total	0,018	1,8	

No dangerous substances from the candidate list of SVHC for Authorization are present in concentrations greater than 0.1% by weight in the product.

Results of the environmental performance indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. Note: it is discouraged to use the results of modules A1-A3 without considering the results of module C when module C is declared.

Mandatory impact category indicators according to EN 15804+A2

Results per declared unit – 1kg								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	1,47E+00	9,99E-02	9,16E-04	4,55E-03	2,26E-02	1,58E-04	-6,63E-01
GWP-fossil	kg CO_2 eq.	1,46E+00	1,01E-01	9,16E-04	4,54E-03	2,39E-02	1,58E-04	-6,65E-01
GWP-biogenic	kg CO_2 eq.	5,53E-03	4,49E-05	2,55E-07	3,30E-06	0,00E+00	3,13E-07	2,17E-03
GWP-luluc	kg CO_2 eq.	1,63E-03	4,13E-05	7,74E-08	1,37E-06	2,72E-05	4,69E-08	-1,30E-04
ODP	kg CFC 11 eq.	9,99E-08	2,33E-08	1,98E-10	1,07E-09	3,44E-09	6,51E-11	-2,14E-08
AP	mol H^+ eq.	6,57E-03	1,27E-03	9,58E-06	1,91E-05	2,90E-04	1,50E-06	-3,27E-03
EP-freshwater	kg P eq.	4,98E-04	7,18E-07	3,70E-09	3,70E-08	1,65E-06	1,91E-09	-3,99E-05
EP-marine	kg N eq.	1,41E-03	3,10E-04	4,23E-06	5,75E-06	6,40E-05	5,16E-07	-6,35E-04
EP-terrestrial	mol N eq.	1,54E-02	3,45E-03	4,64E-05	6,35E-05	7,43E-04	5,69E-06	-7,22E-03
POCP	kg NMVOC eq.	6,02E-03	9,63E-04	1,28E-05	2,04E-05	2,03E-04	1,65E-06	-3,44E-03
ADP-minerals & metals*	kg Sb eq.	1,24E-05	1,44E-06	1,40E-09	7,75E-08	1,33E-06	1,44E-09	-1,20E-05
ADP-fossil*	MJ	1,17E+01	1,53E+00	1,26E-02	7,07E-02	3,32E-01	4,42E-03	-5,46E+00
WDP*	m^3	6,56E-01	4,93E-03	2,35E-05	2,63E-04	4,71E-03	2,04E-04	-3,11E-01
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP – minerals & metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption							

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Reading example: 6,42E-1 – 0,642

Resource use indicators

Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
PERE	MJ	3,66E+00	1,66E-02	6,82E-05	8,90E-04	5,20E-02	3,57E-05	-5,44E-01
PERM	MJ	2,93E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	3,95E+00	1,66E-02	6,82E-05	8,90E-04	5,20E-02	3,57E-05	-5,44E-01
PENRE	MJ	1,86E+01	1,53E+00	1,26E-02	7,07E-02	3,32E-01	4,42E-03	-5,46E+00
PENRM	MJ	2,50E-03	0,00E+00	0,00E+00	0,00E+00	2,43E-03	7,50E-05	-2,43E-03
PENRT	MJ	1,86E+01	1,53E+00	1,26E-02	7,07E-02	3,34E-01	4,50E-03	-5,46E+00
SM	kg	7,79E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,66E-01
RSF	MJ	9,41E-06	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
FW	m^3	1,97E-02	2,69E-04	1,11E-06	1,47E-05	1,35E-04	4,83E-06	-4,59E-03
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water							

Waste indicators

Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste disposed	kg	2,52E-01	1,53E-03	1,36E-05	6,87E-05	0,00E+00	4,12E-06	-2,58E-01
Non-hazardous waste disposed	kg	2,40E+00	1,25E-01	1,45E-04	7,60E-03	0,00E+00	3,00E-02	-2,17E+00
Radioactive waste disposed	kg	6,52E-05	1,05E-05	8,82E-08	4,85E-07	0,00E+00	2,92E-08	-1,01E-06

Output flow indicators

Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	1,02E-01	0,00E+00	0,00E+00	0,00E+00	9,70E-01	0,00E+00	0,00E+00
Materials for energy recovery	kg	4,70E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	2,07E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Additional environmental information – GWP-GHG*

Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP-GHG	kg CO_2 eq.	1,46E+00	1,01E-01	9,16E-04	4,54E-03	2,39E-02	1,58E-04	-6,65E-01

** This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013) This indicator is almost equal to the GWP indicator originally defined in EN 15804: 2012+A1: 2013.*

Information on biogenic carbon content

Results per declared unit: 1 kg of steel structures		
Biogenic carbon content	**Unit**	**Quantity**
Biogenic carbon content in product	kg C	-
Biogenic carbon content in packaging	kg C	7,95E-3

Additional information

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Electricity production, hydro, run-of-river (Reference product: electricity, high voltage). Lithuania. Ecoinvent 3.6.
Electricity (hydro) CO_2e / kWh	0,004
Electricity data source and quality	Electricity production, wind, >3mw turbine, onshore (Reference product: electricity, high voltage) Lithuania. Ecoinvent 3.6.
Electricity (wind) CO_2e / kWh	0,021
Electricity data source and quality	Electricity production, photovoltaic, 3kwp slanted-roof installation, multi-si, panel, mounted (Reference product: electricity, low voltage) Lithuania. Ecoinvent 3.6.
Electricity (photovoltaic) CO2e / kWh	0,094
Electricity data source and quality	Heat and power co-generation, wood chips, 6667 kw (Reference product: electricity, high voltage) Lithuania. Ecoinvent 3.6.
Electricity (biomass) CO_2e / kWh	0,064
Heat and steam used in production data source and quality	Distric heat, Lithuania (Reference product: heat, district). One Click LCA.2020
District heat, CO_2e / kWh	0.050
Heat and steam used in production data source and quality	Heat and power co-generation, natural gas, conventional power plant, 100mw electrical (Reference product: heat, district or industrial, natural gas). Lithuania. Ecoinvent 3.6.
Natural gas, CO2e/MJ	0,033

References

General Programme Instructions of the International EPD® System. Version 4.0.

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations Principles and procedures.

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

EN 15804+A2 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

PCR 2019:14 Construction products (version 1.3.1).

Bozdağ, Ö and Seçer, M., Energy consumption of RC buildings during their life cycle. Izmir, Dokuz University (2007) and the Level(s) project.

LCA background report: Load bearing steel from Hustal UAB, by Vesta Consulting. August 2023.

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