

Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:

Steel structures

from

AMEKO
KONSTRUKCIJOS



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

Environmental Product Declaration

This is an Environmental Product Declaration for steel structures, produced by JSC Ameko konstrukcijos. The declaration is registered in accordance with the EPD programme of the International EPD® System and the Product Category Rules for Construction Products 2019:14, version 1.1. The EPD are used in both business-to-business (B2B) and business-to-consumer (B2C) communication.

Company information



Owner of the EPD:

JSC Ameko konstrukcijos

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<https://www.amekokonstrukcijos.lt>

Description of the organisation: JSC "Ameko konstrukcijos" is Lithuanian capital company. Our staff has gained a lot of experience in project management, structural design, manufacturing and installation of metal structures. Therefore, we are able to carry out efficient and professional business activities.

Our core business areas are: project management, production of

metal structures, installation of structures. We focus on staff training, production quality control and work safety. Our goal is to offer customers high-quality services that meet their needs. Our company has implemented a production control and surveillance system that has been evaluated and certified by the notified body Inspecta, in accordance with the EU harmonised standard EN 1090-1:2009+A1:2012.

Name and location of production site(s): The manufacturing plant of JSC Ameko konstrukcijos is based in Gargzdai (Lithuania).

Product information

Product name: Steel structures

Product identification: The manufactured metal structures comply with the requirements of the European Union (EU), health and environmental protection regulations and are marked with the CE mark.

The manufacturing process of the product is certified and complies with the following European Union regulations:

- EN 1090-2:2018;
- EN ISO 4063:2010;
- EN 1090-1:2009+A1:2012

Product description: Steel structures such as columns, beams, trusses, and braces made of different steel components: hot-rolled plate, cold-formed structural hollow sections, hot finished structural hollow sections, hot -rolled sections. The process requires electricity (green and from the public electricity supplier), gas and fuels for the different equipment. These steel structures are blasted, cut according to customers drawings, welded with welding wires, and painted at Ameko konstrukcijos factory in Gargždai (Lithuania). The steel waste produced at the plant is directed into recycling.

Structural steel products are used for industrial, agricultural and commercial buildings, public and sport buildings, shopping malls, constructions of technological equipment.

Products are available in various sizes, shapes, and lengths, according to customers drawings and needs. All products are ordered by clients as custom projects. Biggest height - 4500 mm, length – 24000 mm, weight - 20 t. Detailed technical data is delivered with every delivery on CE-mark (declaration of compliance).

UN CPC code: 412

Geographical scope: Europe

LCA information

Functional unit / declared unit: In accordance with the PCR the declared unit is 1 tonne of the product.

Reference service life: The reference service life for the steel structures is set at 60 years.

Time representativeness: Primary data was collected internally. The production data refers to the average of the year 2020.

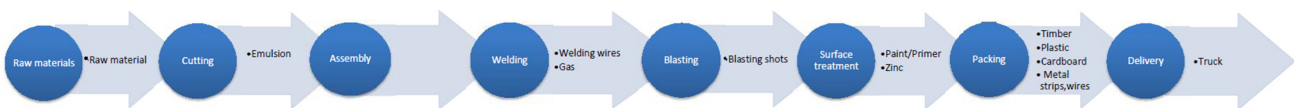
Database(s) and LCA software used: The Ecoinvent database provides the life cycle inventory data for the raw and process materials obtained from the background system. The used database is Ecoinvent 3.6. The LCA software used is One Click LCA.

Description of system boundaries: Cradle to gate with options. The LCA was carried out considering the Product stage phases (A1, A2, A3), Assembly (A4, A5) and End of life (C1, C2, C3, C4), Potential environmental benefits (D) in accordance with EN 15804.

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 98% of total material and energy input flows have been included in the life cycle analysis. Although, only materials having in summa less than 1% of weight of product were not used in calculations.

System diagram:



System boundary:

Product stage			Assembly 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
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

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

Product stage:

A1: This stage considers the extraction and processing of raw materials as well as 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. Specifically, it covers steel tube piles and structural steel poles production. It also considers the energy consumption and waste generated at production plant.

Production process description

Steel plates are cut by plasma machine, profiles are cut by steel saw according to the project required length, assembled, and then welded together, shot blasted and coated with primer or/ and paint, or HDG coating. HDG coating subcontracting. Products are packed and loaded to trucks.

Assembly stage:

A4: This stage includes transport 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 truck with a trailer with an average load of 16-32t
Distance	100 % of production: Truck – 121 km;
Capacity utilization	56 % of the capacity in volume

A5: The environmental impacts of this stage include emissions generated when products are assembled on construction site. This stage includes energy and all ancillary resources needed products to be installed. Also, waste generated during installation processes should be included.

Use stage:

In normal use scenario, it is assumed that no maintenance (B2), repair (B3), replacement (B4) and refurbishment (B5) is needed.

End of Life stage:

This stage includes the following modules:

C1: Deconstruction, dismantling, demolition.

Consumption of fuel in demolition process is calculated according to transported mass. Energy consumption for demolition is 10 kWh/1000 kg. The source of energy is diesel fuel used by work machines.

C2: Transport of the discarded product to the processing site.

Scrap metal are transported to the processing site. Materials are transported by truck with a >32-ton trailer. A transportation distance of 50 km has been considered.

C3: Waste processing for reuse, recovery and/or recycling.

Based on European average 90% of steel are transformed into secondary material in a recycling plant.

C4: Discharge (disposal).

10% of the steel cannot be separated and are assumed to be 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, %
Steel	96-98
Primers and paints	Up to 3
Welding consumables	Up to 1
TOTAL	100

No dangerous substances from the candidate list of SVHC for Authorisation are used in the product.

Packaging

Distribution packaging: in rare cases it is used protective film, timber, cardboards.

After use, packaging materials can be re-used or recycled. Plastic film and carboards can be collected separately and directed to the cycle. Timber can be re-used again.

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804:2012+A2:2019

Results per declared unit												
Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	1,31E+03	1,50E+01	4,38E+01	1,37E+03	2,02E+01	9,05E+00	3,30E+00	4,55E+00	2,10E+01	5,278E-1	-5,02E2
GWP-fossil	kg CO ₂ eq.	1,30E+03	1,50E+01	4,01E+01	1,36E+03	2,02E+01	9,05E+00	3,30E+00	4,54E+00	2,22E+01	5,266E-1	-5,035E2
GWP-biogenic	kg CO ₂ eq.	3,26E+00	1,091E-2	3,33E+00	6,60E+00	1,076E-2	2,517E-3	9,168E-4	3,3E-3	-1,273E0	1,044E-3	1,65E+00
GWP-luluc	kg CO ₂ eq.	8,529E-1	4,523E-3	3,721E-1	1,23E+00	7,152E-3	7,646E-4	2,785E-4	1,368E-3	2,521E-2	1,564E-4	-9,851E-2
ODP	kg CFC 11 eq.	9,031E-5	3,533E-6	6,345E-6	1,002E-4	4,582E-6	1,954E-6	7,119E-7	1,068E-6	3,19E-6	2,169E-7	-1,623E-5
AP	mol H ⁺ eq.	6,56E+00	6,312E-2	2,449E-1	6,87E+00	8,238E-2	9,464E-2	3,448E-2	1,909E-2	2,693E-1	4,998E-3	-2,477E0
EP-freshwater	kg P eq.	9,627E-2	1,223E-4	1,828E-3	9,822E-2	1,688E-4	3,659E-5	1,333E-5	3,697E-5	1,532E-3	6,363E-6	-3,023E-2
EP-marine	kg N eq.	1,28E+00	1,902E-2	4,554E-2	1,34E+00	2,449E-2	4,179E-2	1,523E-2	5,752E-3	5,941E-2	1,721E-3	-4,809E-1
EP-terrestrial	mol N eq.	1,47E+01	2,101E-1	5,193E-1	1,54E+01	2,704E-1	4,584E-1	1,67E-1	6,352E-2	6,892E-1	1,896E-2	-5,464E0
POCP	kg NMVOC eq.	6,10E+00	6,755E-2	1,403E-1	6,31E+00	8,279E-2	1,26E-1	4,592E-2	2,042E-2	1,883E-1	5,506E-3	-2,606E0
ADP-minerals&metals*	kg Sb eq.	2,061E-2	2,564E-4	2,327E-4	2,11E-2	5,455E-4	1,382E-5	5,034E-6	7,754E-5	1,23E-3	4,812E-6	-9,078E-3
ADP-fossil*	MJ	1,64E+04	2,34E+02	7,27E+02	1,74E+04	3,04E+02	1,25E+02	4,54E+01	7,07E+01	3,08E+02	1,47E+01	-4,132E3
WDP	m ³	7,83E+02	8,696E-1	7,10E+00	7,91E+02	9,791E-1	2,323E-1	8,462E-2	2,629E-1	4,37E+00	6,807E-1	-2,356E2
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.

Use of resources

Results per declared unit												
Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1,63E+03	2,94E+00	4,36E+02	2,06E+03	4,29E+00	6,736E-1	2,454E-1	8,897E-1	4,83E+01	1,19E-1	-4,119E2
PERM	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	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,63E+03	2,94E+00	4,36E+02	2,06E+03	4,29E+00	6,736E-1	2,454E-1	8,897E-1	4,83E+01	1,19E-1	-4,119E2
PENRE	MJ	1,61E+04	2,34E+02	7,27E+02	1,70E+04	3,04E+02	1,25E+02	4,54E+01	7,07E+01	3,08E+02	1,47E+01	-4,132E3
PENRM	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	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,61E+04	2,34E+02	7,27E+02	1,70E+04	3,04E+02	1,25E+02	4,54E+01	7,07E+01	3,08E+02	1,47E+01	-4,132E3
SM	kg	6,27E+02	0,00E+00	0,00E+00	6,27E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,01E+02
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	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	0,00E+00	0,00E+00	0,00E+00
FW	m3	1,03E+01	4,867E-2	1,788E-1	1,05E+01	5,197E-2	1,1E-2	4,007E-3	1,472E-2	1,256E-1	1,611E-2	-3,473E0
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 production and output flows

Waste production

Results per declared unit												
Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	4,40E+02	2,272E-1	1,55E+00	4,42E+02	3,088E-1	1,34E-1	4,882E-2	6,869E-2	0,00E+00	1,373E-2	-1,952E2
Non-hazardous waste disposed	kg	3,94E+03	2,51E+01	7,55E+01	4,04E+03	2,12E+01	1,43E+00	5,218E-1	7,60E+00	0,00E+00	1,00E+02	-1,642E3
Radioactive waste disposed	kg	4,89E-2	1,605E-3	4,569E-3	5,508E-2	2,085E-3	8,72E-4	3,177E-4	4,852E-4	0,00E+00	9,74E-5	-7,682E-4

Output flows

Results per declared unit												
Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	5,89E+01	5,89E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	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	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	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	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Reading example: $9.00E-03 = 9.0 \cdot 10^{-3} = 0.009$


ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Potential environmental impact per declared unit												
Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP	kg CO ₂ eq.	1,26E+03	1,49E+01	4,03E+01	1,32E+03	2,00E+01	8,98E+00	3,27E+00	4,50E+00	2,19E+01	5,168E-1	-4,81E2
ODP	kg CFC 11 eq.	8,179E-5	2,808E-6	5,963E-6	9,057E-5	3,646E-6	1,547E-6	5,634E-7	8,491E-7	2,707E-6	1,718E-7	-1,415E-5
AP	mol H ⁺ eq.	5,09E+00	3,058E-2	1,914E-1	5,32E+00	4,045E-2	1,336E-2	4,866E-3	9,246E-3	1,673E-1	2,084E-3	-2,04E0
EP	kg PO ₄ ³⁻ eq.	3,32E+00	6,177E-3	6,599E-2	3,39E+00	8,309E-3	2,353E-3	8,573E-4	1,868E-3	6,83E-2	4,032E-4	-1,391E0
POCP	kg Ethenee	6,698E-1	1,938E-3	8,334E-3	6,8E-1	2,662E-3	1,375E-3	5,011E-4	5,858E-4	7,841E-3	1,528E-4	-3,305E-1
ADP-minerals & metals*	kg Sb eq.	2,061E-2	2,564E-4	2,327E-4	2,11E-2	5,455E-4	1,382E-5	5,034E-6	7,754E-5	1,23E-3	4,812E-6	-9,078E-3
ADP-fossil*	MJ	1,64E+04	2,34E+02	7,27E+02	1,74E+04	3,04E+02	1,25E+02	4,54E+01	7,07E+01	3,08E+02	1,47E+01	-4,132E3
Acronyms	GWP = Global Warming Potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential; EP = Eutrophication potential; POCP = Formation of ozone of lower atmosphere; 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.

Programme information

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CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR 2019:14 Construction products (version 1.1)
PCR review was conducted by: The International EPD® System
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: Vladimir Kočí, LCA Studio Approved by: The International EPD® System 
Procedure for follow-up of data during EPD validity involves third party verifier: <input checked="" type="checkbox"/> Yes <input 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. For further information about comparability, see EN 15804 and ISO 14025.

References

- General Programme Instructions of the International EPD® System. Version 3.01;
- PCR 2019:14 Construction products (version 1.1)
- EN 15804:2012+A2:2019 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products.
- ISO 14020:2001 Environmental labels and declarations – General principles.
- ISO 14044:2006 Environmental management. Life Cycle Assessment. Requirements and guidelines.
- ISO 14025:2010 Environmental labels and declarations. Type III environmental declarations. Principles and procedures.

Tools and database

- One Click LCA tool;
- Ecoinvent 3.6 database

Contact information

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