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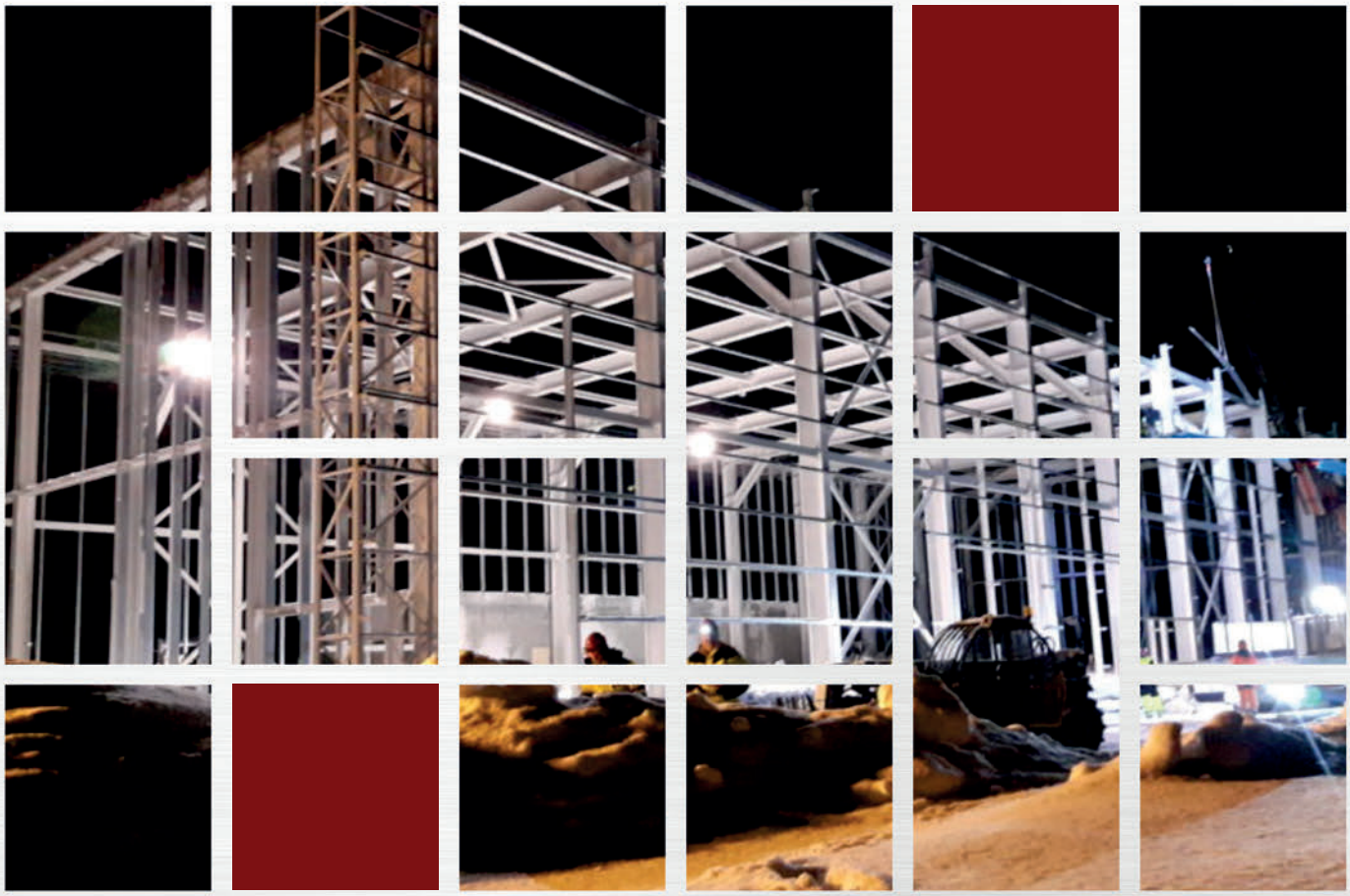
Steel Structures

Environmental Product Declaration

ECO EPD Ref. No.
00000984



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ENVIRONMENTAL PRODUCT DECLARATION TYPE III ITB NO. 095/2019

Basic information

This declaration is the type III Environmental Product Declaration (EPD) based on EN 15804 and verified according to ISO 14025 by an external auditor. It contains the information on the impacts of the declared construction materials on the environment. Their aspects were verified by the independent body according to ISO 14025. Basically, a comparison or evaluation of EPD data is possible only if all the compared data was created according to EN 15804 (see point 5.3 of the standard).

Life cycle analysis (LCA):	A1-A3, C3, C4 and D modules in accordance with EN 15804 (Cradle to Gate with options)
The year of preparing the EPD:	2019
Product standard:	EN 1090-1, EN 1090-2
Service Life:	50 years for standard product
PCR:	ITB-PCR A (PCR based on EN 15804)
Declared unit:	1 ton
Reasons for performing LCA:	B2B
Representativeness:	Polish product

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About Us

General information about OMIS S.A.

OMIS S.A. has been operating on the steel based construction market **since 2012**.

Today OMIS team **exceeds 230 people**, including 60 highly qualified engineering, design and management professionals.

OMIS S.A., has implemented and maintains the *Integrated Quality, Environment and Occupational Health & Safety Management System*, based on the following standards: ISO 9001, ISO 14001, OHSAS 1800, EN 1090-1, EN 1090-2.

OMIS business activities are focusing on:

- Design, manufacturing and assembly of steel structures,
- Design, manufacturing and erection of specialized equipment and technological systems,
- Industrial engineering services in the fields of energy production, paper production, mining industry and production of building materials,
- EPC of steel based building projects.

Steel Structures
Product description

1 Welded beams: H, HSQ, ISQ, HSI and HSK sections

Technical data:
Dimensions:
H = 150–600mm , B1 = 110-600mm,
B2 = 140-700mm, d = 5-12mm, tl/t2 = 6-60mm.
The requirements of the EN 10025 and EN 1090-2 standards are applied.
The standard steel grade is ≤ S355.

Product specification:
Plates are made by European manufacturers.
Sections are prefabricated and erected on-site by European steel contractors or EPC contractors.

Market:
Europe

2 Beams, columns, subframes, purlins, girders, railings made of I, H, U, L, T, wide flats hot-rolled sections, cold formed (CFSHS) or hot finished structural hollow sections (HFSHS) or pipes - flat/solid

Technical data:
Dimensions:
Steel plates: thickness 2-100mm, I, H, U, L, T: 60-900mm,
Square HS: 40x3mm - 400x20mm.
Rectangular HS: 50x25x2mm - 400x200x12,5mm
Circular HS: 21,3x2mm - 711x60mm
EN 1090-2 standards are applied.
Steel grade ≤ S355.

Product specification:
Plates are made by European manufacturers.
Sections are prefabricated and erected on-site by European steel contractors or EPC contractors

Market:
Europe

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Steel Structures
Product description

3 Trusses, beams, columns, subframes, purlins, girders made of I, H, U, L, T, wide flats hot-rolled sections, cold formed (CFSHS) or hot finished structural hollow sections (HFSHS) or pipes - spatial/ lattice

Technical data:
Dimensions:
Steel Plates: thickness 2-100mm, I, H, U, L, T: 60-900mm
Square HS: 40x3mm - 400x20mm
Rectangular HS: 50x25x2mm - 400x200x12,5mm
Circular HS: 21,3x2mm - 711x60mm
EN 1090-2 standards are applied.
Steel grade ≤ S355.

Product specification:
Plates are made by European manufacturers.
Sections are prefabricated and erected on-site by European steel contractors or EPC contractors.

Market:
Europe

4 Plate products such as ducts, casings, hoppers, chutes, tanks

Technical data:
Dimensions:
Steel Plates: thickness 2-100mm, I, H, U, L, T: 60-500mm
Square HS: 40x3mm - 200x8mm
Rectangular HS: 50x25x2mm - 200x150x6mm
Circular HS: 30x2,6mm - 355,6 x 30mm
EN 1090-2 standards are applied.
Steel grade ≤ S355.

Product specification:
Plates are made by European manufacturers.
Sections are prefabricated and erected on-site by European steel contractors or EPC contractors.

Market:
Europe

Steel Structures
Applications

The above listed products / product groups are used in the following construction projects:

- residential buildings
- public buildings
- infrastructure
- storage halls
- power industry
- flue gas cleaning
- manufacturing facilities
- chemical industry

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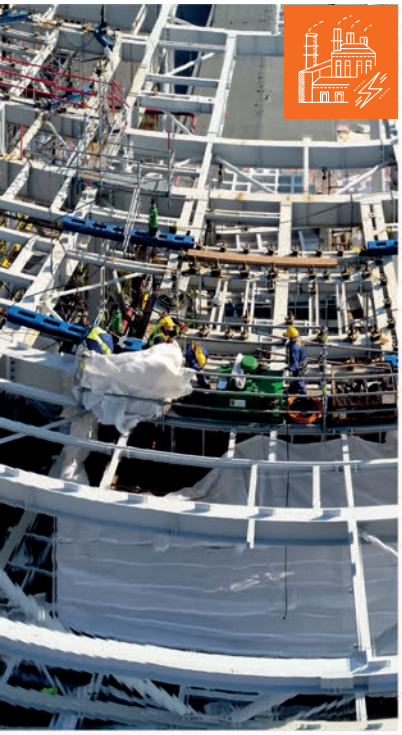
Steel Structures
Applications



Life Cycle Assessment (LCA)

General rules applied

Allocation

The allocation rules used for this EPD are based on general ITB PCR A. Production of the steel structures is a line process in one factory of OMIS S.A. in Ostrołęka (Poland) while zinc coating process is outsourced (Termetal Sp. k. group operating in Poland). Allocation was done on product mass basis. All impacts from raw materials extraction are allocated in A1 module of the LCA. 100% of impacts from line production of OMIS S.A and Termetal Sp.k. were inventoried and 95% impacts of OMIS S.A. were allocated to the steel structures production. Utilization of packaging material was not taken into consideration. Module A2 includes transport of raw materials, steel semi-finished products, additives and ancillary materials from their suppliers to OMIS S.A. factory in Ostrołęka and Termetal Sp. k. Municipal waste of factories were allocated to module A3. Energy supply was inventoried for the steel structures production process and the zinc coating operation. Emissions in the factories are measured and were allocated to module A3.

System limits

A1 and A2 Modules: Raw materials supply and transport

Steel semi-finished products used for the production of the steel structures come from various steelmaking plants. Ancillary materials such as welding wires, anticorrosive paints and packaging materials come from local suppliers. Data on transport of the different products to the manufacturing plants is collected and modelled for factory by assessor. Means of transport include trucks. For calculation purposes Polish and European fuel averages are applied.

A3 Production

The production process at Ostrołęka manufacturing plant includes the following key stages:

- Engineering, calculations, 3D modelling and workshop drawings preparation basing on specialised design platforms for structures, installations or machines (IDEA Statica Robot Millenium, TEKLA Structures, BOCAD, Solid Works)
- Advanced material logistics using advanced MMS platform,
- Preliminary material shot-blasting up to Sa 2,
- Fabrication process (cutting, drilling, punching, bending, machining, etc.) with the use of modern CNC fabrication machinery (Voortman, Eckert, Durma),
- Top quality welded joints performed using PULSE and TIME technology; fully digitized and microprocessor-controlled MIG/MAG welding power source (Fronius, Esab, Kemppi); highly qualified manufacturing team supervised by certified International Welding Engineers (IWE/EWE)
- Thorough quality control by NDT (non destructive testing) - x-rays, ultrasonic and penetrant tests; experienced team of certified VT(1 & 2), MT(1 & 2) and PT(1 & 2) controllers
- Corrosion protection in C1-C5M classes through airless painting as well as hot dip galvanizing. On client's request fire protection coatings up to R60 class.
- Labelling, quality documentation, dispatch including sea tight packaging.

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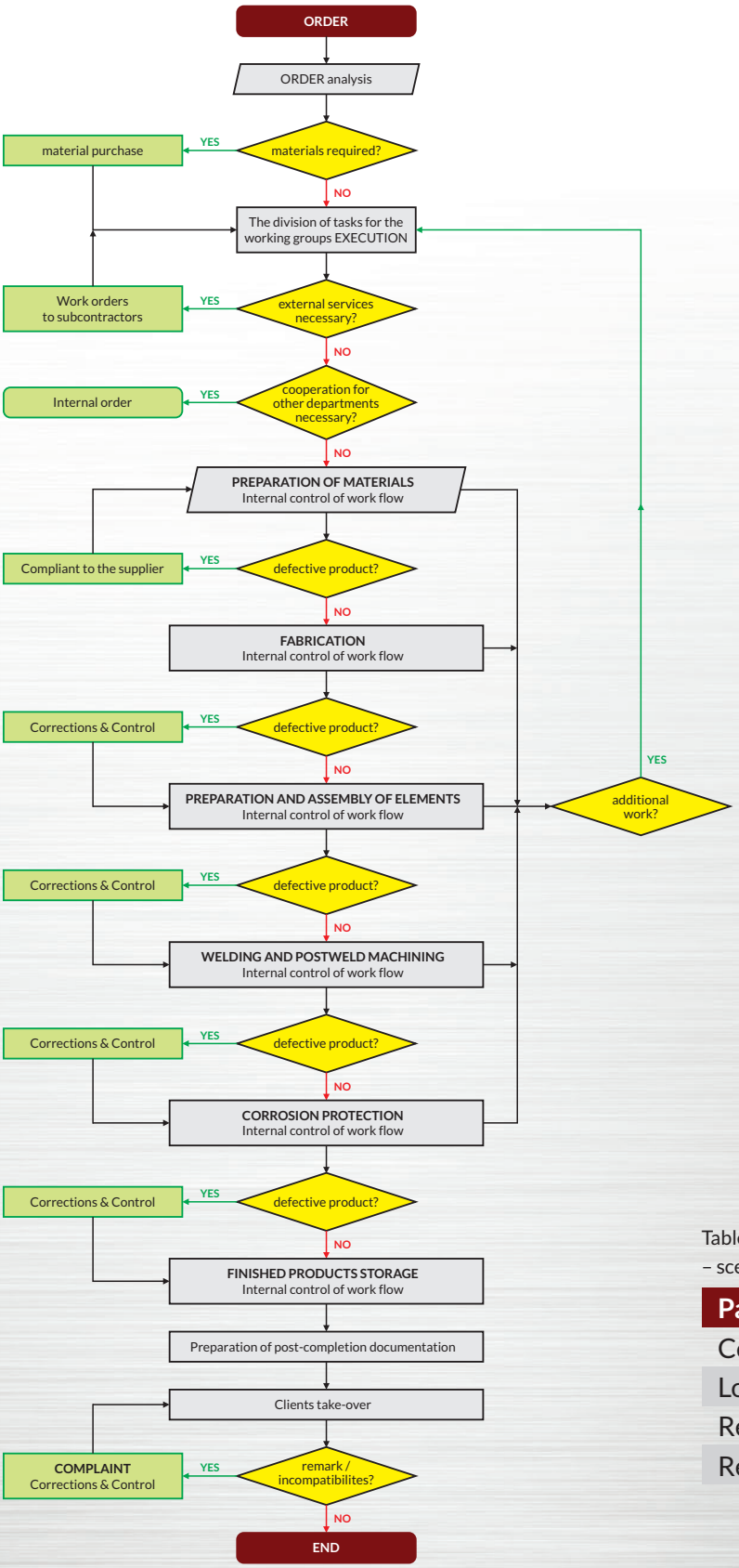
Life Cycle Assessment (LCA)

General rules applied

A scheme of manufacturing of the steel structures
by OMIS S.A. in factory in Ostrołęka (Poland)



C3 Waste processing

This module takes into account sorting, shredding and pressing of the steel at the end-of-life.

C4 Disposal

Steel is 100% recyclable, thus it is estimated that at the end-of-life only 1% of the declared product is disposed to landfill in the form of mixed construction wastes.

D Re-use, recovery, recycling potential

Benefits and loads beyond the system boundary were calculated using a net scrap formulation proposed by World Steel Association in *Life cycle inventory methodology report* (2017) where the net scrap is determined as a difference between the amount of steel recycled at end-of-life and the scrap input from previous product life cycle (assumed 85%).

Table 1. Re-use, recovery and recycling potential – scenario information

Parameter	Value
Collection	100%
Loss (mixed construction waste)	1%
Recycling	98%
Re-use	1%

Life Cycle Assessment (LCA)
General rules applied

Data collection period
The data for manufacture of the declared products refer to period between 01.01.2018 – 31.12.2018 (1 year).
The life cycle assessments were prepared for Poland as reference area.

Data quality
The values determined to calculate the LCA originate from verified OMIS S.A. inventory data

Assumptions and estimates
The impacts of the representative steel structures were aggregated using weighted average.
Impacts were inventoried and calculated for all products of the steel structures.

Calculation rules
LCA was done in accordance with ITB PCR A document.

Databases
The data for the processes come from the following databases: Ecoinvent v.3.5, specific EPDs, ELCD, ÖKOBAUDAT, Ullmann's, ITB-Data. Specific data quality analysis was a part of external ISO 14001 audit.
Characterization factors are CML ver. 4.2 based on EN 15804:2013+A1 version (PN-EN 15804+A1:2014-04).

Declared unit

The declaration refers to functional unit (FU) – 1 tonne of the steel structures produced by OMIS S.A.

Table 2. System boundaries for the environmental characteristic of the steel structures

Environmental assessment information (MNA – Module not assessed, MD – Module Declared, INA – Indicator Not Assessed)																
Product stage			Construction process		Use stage								End of life			Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction 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
MD	MD	MD	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MD	MD	MD

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Steel structures

Environmental impacts: (FU) 1 tonne

Indicator	Unit	A1	A2	A3	A1-A3
Global warming potential	[kg CO_2 eq.]	1.28E+03	2.96E+01	9.80E+01	1.40E+03
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.]	5.79E-07	0.00E+00	0.00E+00	5.79E-07
Acidification potential of soil and water	[kg SO_2 eq.]	3.30E+00	2.16E-01	2.76E-03	3.52E+00
Formation potential of tropospheric ozone	kg Ethene eq.]	3.78E-01	1.58E-02	3.63E-01	7.58E-01
Eutrophication potential	kg $(PO4)^{3-}$ eq.]	2.83E-01	3.81E-02	5.13E-04	3.21E-01
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	5.83E-02	0.00E+00	3.63E-04	5.87E-02
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	1.12E+04	2.70E+02	1.12E+03	1.26E+04

Environmental aspects on resource use: (FU) 1 tonne

Indicator	Unit	A1	A2	A3	A1-A3
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	7.85E+02	1.99E+01	6.01E+01	8.65E+02
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	1.38E+04	2.84E+02	1.18E+03	1.53E+04
Use of secondary material	[kg]	8.48E+02	0.00E+00	0.00E+00	8.48E+02
Use of renewable secondary fuels	[MJ]	0.00E+00	1.42E+01	0.00E+00	1.42E+01
Use of non-renewable secondary fuels	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water	[m^3]	INA	INA	INA	INA

Other environmental information describing waste categories: (FU) 1 tonne

Indicator	Unit	A1	A2	A3	A1-A3
Hazardous waste disposed	[kg]	1.22E-04	2.96E-05	2.15E-01	2.15E-01
Non-hazardous waste disposed	[kg]	8.74E+00	2.75E-02	9.32E+00	1.81E+01
Radioactive waste disposed	[kg]	6.78E-01	0.00E+00	0.00E+00	6.78E-01
Components for re-use	[kg]	0.00E+00	0.00E+00	1.67E+01	1.67E+01
Materials for recycling	[kg]	1.10E-03	0.00E+00	3.04E+00	3.04E+00
Materials for energy recover	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	[MJ per energy carrier]	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Life Cycle Assessment (LCA)

Results

Environmental impacts: (FU) 1 tonne

Indicator	Unit	C3	C4	D
Global warming potential	[kg CO_2 eq.]	2.11E+00	2.74E-02	-1.14E+03
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	7.09E-10	9.52E-09	5.02E-07
Acidification potential of soil and water	[kg SO_2 eq.]	7.11E-03	2.05E-04	-2.34E+00
Formation potential of tropospheric ozone	[kg Ethene eq.]	5.51E-04	1.88E-05	-3.53E-01
Eutrophication potential	[kg $(PO4)^{3-}$ eq.]	8.22E-04	4.28E-05	-2.11E-01
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	7.90E-07	3.01E-08	-5.36E-02
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	2.02E+01	8.26E-01	-1.12E+04

Environmental aspects on resource use: (FU) 1 tonne

Indicator	Unit	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA
Use of renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	9.85E+00	1.93E-02	7.73E+02
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	3.54E+01	8.64E-01	-6.34E+03
Use of secondary material	[kg]	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	[MJ]	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	[MJ]	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water	[m^3]	INA	INA	INA

Other environmental information describing waste categories: (FU) 1 tonne

Indicator	Unit	C3	C4	D
Hazardous waste disposed	[kg]	3.22E-07	5.43E-07	-1.92E-01
Non-hazardous waste disposed	[kg]	2.08E+01	1.11E-01	-7.19E+00
Radioactive waste disposed	[kg]	4.60E-03	5.54E-06	-6.77E-01
Components for re-use	[kg]	1.00E+01	0.00E+00	0.00E+00
Materials for recycling	[kg]	9.80E+02	0.00E+00	0.00E+00
Materials for energy recover	[kg]	0.00E+00	0.00E+00	0.00E+00
Exported energy	[MJ per energy carrier]	INA	INA	INA

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Zinc-coated steel structures

Environmental impacts: (FU) 1 tonne

Indicator	Unit	A1	A2	A3	A1-A3
Global warming potential	[kg CO_2 eq.]	1.37E+03	3.01E+01	1.38E+01	1.54E+03
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.]	1.40E-05	0.00E+00	0.00E+00	1.40E-05
Acidification potential of soil and water	[kg SO_2 eq.]	4.05E+00	2.20E-01	7.00E-02	4.34E+00
Formation potential of tropospheric ozone	kg Ethene eq.]	4.27E-01	1.60E-02	3.63E-01	8.07E-01
Eutrophication potential	kg $(PO4)^{3-}$ eq.]	4.71E-01	3.88E-02	1.14E-02	5.22E-01
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	1.01E-01	0.00E+00	5.03E-04	1.02E-01
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	1.34E+04	2.84E+02	1.52E+03	1.52E+04

Environmental aspects on resource use: (FU) 1 tonne

Indicator	Unit	A1	A2	A3	A1-A3
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	1.18E+03	2.08E+01	8.68E+01	1.28E+03
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	1.58E+04	2.98E+02	1.59E+03	1.77E+04
Use of secondary material	[kg]	8.48E+02	0.00E+00	0.00E+00	8.48E+02
Use of renewable secondary fuels	[MJ]	0.00E+00	1.49E+01	0.00E+00	1.49E+01
Use of non-renewable secondary fuels	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water	[m^3]	INA	INA	INA	INA

Other environmental information describing waste categories: (FU) 1 tonne

Indicator	Unit	A1	A2	A3	A1-A3
Hazardous waste disposed	[kg]	2.95E-03	4.74E-05	3.31E-01	3.34E-01
Non-hazardous waste disposed	[kg]	1.62E+01	4.40E-02	8.39E+01	1.00E+02
Radioactive waste disposed	[kg]	6.82E-01	0.00E+00	0.00E+00	6.82E-01
Components for re-use	[kg]	0.00E+00	0.00E+00	1.67E+01	1.67E+01
Materials for recycling	[kg]	1.10E-03	0.00E+00	1.60E+01	1.60E+01
Materials for energy recover	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	[MJ per energy carrier]	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Life Cycle Assessment (LCA)

Results

Environmental impacts: (FU) 1 tonne

Indicator	Unit	C3	C4	D
Global warming potential	[kg CO_2 eq.]	2.11E+00	2.74E-02	-1.16E+03
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	7.09E-10	9.52E-09	1.16E-05
Acidification potential of soil and water	[kg SO_2 eq.]	7.11E-03	2.05E-04	-2.56E+00
Formation potential of tropospheric ozone	[kg Ethene eq.]	5.51E-04	1.88E-05	-3.21E-01
Eutrophication potential	[kg $(PO4)^{3-}$ eq.]	8.22E-04	4.28E-05	-3.78E-01
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	7.90E-07	3.01E-08	9.65E-02
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	2.02E+01	8.26E-01	-1.15E+04

Environmental aspects on resource use: (FU) 1 tonne

Indicator	Unit	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA
Use of renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	9.85E+00	1.93E-02	1.00E+03
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	3.54E+01	8.64E-01	-6.72E+03
Use of secondary material	[kg]	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	[MJ]	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	[MJ]	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water	[m^3]	INA	INA	INA

Other environmental information describing waste categories: (FU) 1 tonne

Indicator	Unit	C3	C4	D
Hazardous waste disposed	[kg]	3.22E-07	5.43E-07	-3.08E-01
Non-hazardous waste disposed	[kg]	2.08E+01	1.11E-01	-8.44E+01
Radioactive waste disposed	[kg]	4.60E-03	5.54E-06	-6.69E-01
Components for re-use	[kg]	1.00E+01	0.00E+00	0.00E+00
Materials for recycling	[kg]	9.80E+02	0.00E+00	0.00E+00
Materials for energy recover	[kg]	0.00E+00	0.00E+00	0.00E+00
Exported energy	[MJ per energy carrier]	0.00E+00	0.00E+00	0.00E+00

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Verification

The process of verification of this EPD is in accordance with ISO 14025 and ISO 21930. After verification, this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years, if the underlying data has not changed significantly.

The basis for LCA analysis was EN 15804 and ITB PCR A

Independent verification corresponding to ISO 14025 (subclause 8.1.3.)

☑ **external** ☐ **internal**

External verification of EPD: Ph.D. Eng. Halina Prejzner
LCA, LCI audit and input data verification: Ph.D. Eng. Justyna Tomaszewska, j.tomaszewska@itb.pl
Verification of LCA: Ph.D. Eng. Michał Piasecki, m.piasecki@itb.pl

Normative references

- ITB PCR A General Product Category Rules for Construction Products
- ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services
- ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines
- ISO 15686-1:2011 Buildings and constructed assets – Service life planning – Part 1: General principles and framework
- ISO 15686-8:2008 Buildings and constructed assets – Service life planning – Part 8: Reference service life and service-life estimation
- EN 15804:2012+A1:2013 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- PN-EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business
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