epd-norway
Global Program Operator

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804+A2

MERO-TSK International GmbH & Co. KG
Spatial supporting and single-layer structure

MERO-TSK International GmbH & Co. KG
Certified ISO 9001 / 14001

Owner of the declaration
MERO-TSK International GmbH & Co. KG
Max-Mengeringhausen-Strasse 5
D-97084 Wuerzburg
Germany

Product
Spatial supporting and single-layer structure

Declared product / Declared unit
1 kg

This declaration is based on Product Category Rules
EN 15804:2012 + A2:2019,
NPCR 013 Part B for Steel and Aluminium Construction Products

Program operator:
EPD Norway
Majorstuen P.O. Box 5250
N-0303 Oslo
Norway

Declaration number
NEPD-10177-10177-2

Registration number
NEPD-10177-10177-2

Issue date
04.08.2025

Valid to
03.08.2030

EPD Software
Emidat EPD Tool v1.0.0

General Information

Product
Spatial supporting and single-layer structure

Program Operator
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Declaration Number
NEPD-10177-10177-2

This declaration is based on Product Category Rules
EN 15804:2012 + A2:2019,
NPCR 013 Part B for Steel and Aluminium Construction Products

Statements
The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer, life cycle assessment data and evidences.

Declared unit
1 kg

General information on verification of EPD from EPD tools
Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPDNorway's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Norway, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools.

Verification of EPD tool
Charlotte Merlin, FORCE Technology
(no signature required)

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Place of production
Prichsenstadt, Germany

Management system
ISO 14001, ISO 9001

Issue date
04.08.2025

Valid to
03.08.2030

Year of study
2024

Comparability
EPDs of construction products may not be comparable if they do not comply with EN 15804 and are not seen in a building context. EPD data may not be comparable if the datasets used are not developed in accordance with EN 15804 and if the background systems are not based on the same database (including primary and secondary data).

Development and verification of EPD
The declaration was created using the Emidat EPD tool v1.0, developed by Emidat GmbH. The EPD tool has been approved by EPD Norway.

Developer of EPD: Rainer Philipp
Reviewer of company-specific input data and EPD: Carina Amend

Approved

Håkon Hauan, CEO EPD-Norge

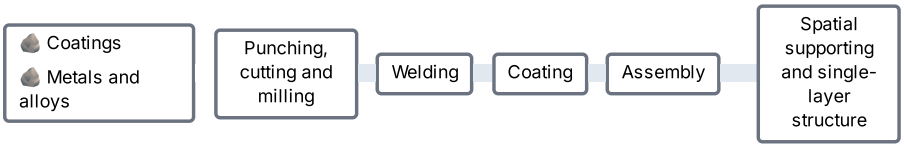
Product

Product description

The product consists of a combination of steel tubes and steel nodes.

The nodes are galvanized and, if required, powder-coated or wet-painted. The tubes are hot-dip galvanized and / or powder-coated / wet-painted (round tubes) or wet-painted (rectangular tubes).

The tubes (rectangular or round) are connected by nodes (block nodes or ball nodes) to form a single-layer or multi-layer structure.



These structures typically serve for roofing buildings and can be glazed or covered with other materials (membranes, foils, metal cladding).

Due to the construction method, there is already a saving of approximately 67% in material compared to a conventional steel construction.

Applications range from simple canopies to roofing sports stadiums, shopping malls, production halls, railway stations, airports, aircraft hangars and special constructions.

Projects with spans of over 100 m and roof surface of 200,000 m² have already been realized with this system.

The structures are either placed directly on the ground or on supports / columnes.

Product specification

Name of ingredient	Share of total weight	Country of origin
Coatings	0 - 2 %	Germany
Metals and alloys	80 - 100 %	Various

Technical data

	Unit	Value
Density	kg / m³	7850.0
Modulus of elasticity	N / mm²	210000.0
Coefficient of thermal expansion	10^-6 / K	11.9
Thermal conductivity	W / (mK)	40.0
Electrical conductivity at 20°C	1 / (Ωm)	6.8
Miminum yield strength	N / mm²	355.0
Minimum tensile strength	N / mm²	490630.0
Minimum elongation	%	1822.0
Tensile strength	N / mm²	490630.0
Compressive strength	N / mm²	355.0
Grade of materials according to the delivery standard	-	+N
Total mass	kg	1.0

Market
Germany

LCA: Calculation rules

Declared unit
1 kg

Reference service life
Not defined

Data quality
The foreground data are based on extensive and detailed data collection at the production site of the manufacturer, covering key processes such as raw material sourcing, formulation, and manufacturing. These foreground data are fully linked with corresponding datasets from the background database (ecoinvent 3.10) or with EN15804+A2-compliant EPDs, ensuring consistency, reliability, and maintaining alignment with the latest industry standards.
The overall data representativeness is rated as good with an overall score of 4.04/5, in accordance with EN 15804+A2 Annex E guidance on data quality assessment, considering geographical, technical, and temporal representativeness.

System boundaries (X=included, MND=module not declared)

	Production			Installation		Use stage							End-of-Life				Next product system
	Raw material supply	Transport	Manufacturing	Transport	Installation Process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Demolition	Transport	Waste Processing	Disposal	Benefits and loads beyond the system boundary
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			DE	DE	MND	MND	MND	MND	MND	MND	MND	MND	DE	DE	DE	DE	DE

For the geographies modeled in A1 and A2, refer to *Product specification*.

Type of EPD: Cradle to gate with options A4, C1, C2, C3, C4 and D

Stage of Material Production and Construction
Module A1: Extraction and processing of raw materials
Module A2: Transportation of raw materials to the plant
Module A3: Steel component production at the plant and waste treatment
Module A4: Transportation to the construction site
Disposal Stage
Module C1: Demolition/Dismantling
Module C2: Transportation of steel demolition waste for processing
Module C3: Sorting of waste components and recycling of steel
Module C4: Disposal of steel to landfill
Credits and burdens outside the system boundaries
Module D: Credits and burdens from the use of recycled steel as a replacement for primary steel

Cut-off criteria
No cut-offs were applied.

Allocation

Elementary flows (energy and fuels, ancillary materials and waste) data was collected on production-process-level. Using the total output of the production process in 2024, elementary flows are assigned to 1 declared unit based on mass.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Transport to the building site (A4)	Value	Unit
Transported mass	1.02	kg
Truck: Distance	800.00	km
Truck: Energy demand	1.58	MJ / t*km
Truck: Activity	transport, freight, lorry >32 metric ton, EURO6	-
Truck: Capacity utilization	53.30	%
Ship: Distance	5200.00	km
Ship: Energy demand	0.13	MJ / t*km
Ship: Activity	transport, freight, sea, container ship	-
Ship: Capacity utilization	70.00	%

Demolition (C1)	Value	Unit
Diesel dismantling and sorting	0.04	MJ
Electricity for sorting	0.01	kWh

90.0% of the steel is recycled, 10.0% is sent to landfill.

Transport to the waste facility (C2)	Value	Unit
Mass to recycling	0.90	kg
Mass to landfill	0.10	kg
Distance to landfill by truck	50.00	km
Distance to recycling by truck	50.00	km
Truck: Activity	transport, freight, lorry >32 metric ton, EURO6	-
Truck: Capacity utilization	53.30	%
Truck: Distance	50.00	km
Truck: Energy demand	1.58	MJ / t*km

Waste processing (C3)	Value	Unit
Material for recycling	0.90	kg

Disposal (C4)	Value	Unit
Material for landfill	0.10	kg

Reuse, recovery and/or recycling potentials (D)	Value	Unit
Amount of secondary material that the system takes in	0.88	kg
Substitution of primary steel	0.11	kg
Substitution of electrical energy production	8.70e-03	MJ
Substitution of thermal energy production	0.02	MJ

Calculation of benefits and loads per EN 15804+A2.

LCA: Results

Core environmental impact indicators

Indicator	Unit	A1-3	A4	C1	C2	C3	C4	D
GWP-total	kg CO_2-eq.	1.47e+00	1.39e-01	8.55e-03	5.18e-03	3.37e-01	6.26e-04	-1.56e-01
GWP-fossil	kg CO_2-eq.	1.39e+00	1.39e-01	8.07e-03	5.18e-03	3.27e-01	6.25e-04	-1.57e-01
GWP-biogenic	kg CO_2-eq.	4.91e-02	2.43e-05	4.64e-04	2.60e-06	9.76e-03	6.47e-08	1.49e-03
GWP-luluc	kg CO_2-eq.	3.27e-02	5.84e-05	8.98e-06	1.84e-06	1.53e-04	3.25e-07	-3.74e-05
ODP	kg CFC-11-Eq	1.82e-08	2.54e-09	1.03e-10	1.08e-10	4.18e-09	1.81e-11	-4.70e-10
AP	mol H+-Eq	3.62e-03	1.79e-03	4.38e-05	1.22e-05	1.07e-03	4.43e-06	-5.28e-04
EP-freshwater	kg P-Eq	8.32e-04	7.65e-06	5.84e-06	3.64e-07	1.30e-04	5.19e-08	-7.55e-05
EP-marine	kg N-Eq	9.06e-04	4.49e-04	1.92e-05	3.21e-06	2.77e-04	1.69e-06	-1.26e-04
EP-terrestrial	mol N-Eq	8.39e-03	4.97e-03	1.99e-04	3.47e-05	3.01e-03	1.84e-05	-1.34e-03
POCP	kg NMVOC-Eq	3.57e-03	1.54e-03	5.97e-05	2.12e-05	1.03e-03	6.60e-06	-4.72e-04
ADPE	kg Sb-Eq	3.81e-06	2.94e-07	9.54e-09	1.48e-08	1.13e-06	9.92e-10	-6.00e-09
ADPF	MJ, net calorific value	1.88e+01	1.93e+00	1.17e-01	7.77e-02	4.52e+00	1.53e-02	-1.45e+00
WDP	m^3 world Eq deprived	2.84e-01	8.17e-03	9.85e-04	3.90e-04	2.90e-01	4.29e-05	-1.59e-02

GWP-total: Global Warming Potential - total **GWP-fossil**: Global warming potential - fossil **GWP-biogenic**: Global Warming Potential - biogenic **GWP-luluc**: Global Warming Potential - luluc **ODP**: Depletion potential of the stratospheric ozone layer **AP**: Acidification potential, Accumulated Exceedance **EP-freshwater**: Eutrophication potential - freshwater **EP-marine**: Eutrophication potential - marine **EP-terrestrial**: Eutrophication potential - terrestrial **POCP**: Photochemical Ozone Creation Potential **ADPE**: Abiotic depletion potential - non-fossil resources **ADPF**: Abiotic depletion potential - fossil resources **WDP**: Water (user) deprivation potential

Additional indicators

Indicator	Unit	A1-3	A4	C1	C2	C3	C4	D
PM	disease incidence	4.59e-08	9.82e-09	1.04e-09	5.04e-10	4.49e-08	1.01e-10	-7.87e-09
IRP	kBq U235-Eq	1.49e-01	1.84e-03	1.04e-03	9.44e-05	8.60e-02	9.77e-06	4.81e-03
ETP-fw	CTUe	1.90e+01	4.13e-01	2.18e-02	1.84e-02	2.46e+00	2.10e-03	-1.41e+01
HTP-c	CTUh	6.27e-08	7.68e-10	2.25e-11	3.31e-11	6.83e-09	2.83e-12	-5.36e-08
HTP-nc	CTUh	1.06e-08	1.00e-09	3.75e-11	5.13e-11	1.50e-08	2.75e-12	4.73e-11
SQP	dimensionless	4.57e+00	1.32e+00	1.46e-02	7.82e-02	1.57e+00	3.02e-02	-2.33e-01

PM: Potential incidence of disease due to PM emissions **IRP**: Potential Human exposure efficiency relative to U235 **ETP-fw**: Potential Comparative Toxic Unit for ecosystems **HTP-c**: Potential Comparative Toxic Unit for humans - cancer effects **HTP-nc**: Potential Comparative Toxic Unit for humans - non-cancer effects **SQP**: Potential Soil quality index

IRP: This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

ETP-fw, **HTP-c**, **HTP-nc** and **SQP**: The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with these indicators.

Use of resources

Indicator	Unit	A1-3	A4	C1	C2	C3	C4	D
PERE	MJ	2.60e+00	2.50e-02	1.65e-02	1.23e-03	1.57e+00	1.42e-04	1.15e-01
PERM	MJ	1.36e-01	0	0	0	0	0	0
PERT	MJ	2.73e+00	2.50e-02	1.65e-02	1.23e-03	1.57e+00	1.42e-04	1.15e-01
PENRE	MJ	1.88e+01	1.93e+00	1.17e-01	7.77e-02	4.52e+00	1.53e-02	-1.45e+00
PENRM	MJ	4.30e-02	0	0	0	-3.87e-02	0	0
PENRT	MJ	1.88e+01	1.93e+00	1.17e-01	7.77e-02	4.48e+00	1.53e-02	-1.45e+00
SM	kg	8.80e-01	0	0	0	0	0	1.10e-01
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	7.79e-03	2.28e-04	3.25e-05	1.13e-05	7.02e-03	1.59e-05	-2.63e-04

PERE: Primary energy resources - renewable: use as energy carrier **PERM**: Primary energy resources - renewable: used as raw materials **PERT**: Primary energy resources - renewable: total **PENRE**: Primary energy resources - non-renewable: use as energy carrier **PENRM**: Primary energy resources - non-renewable: used as raw materials **PENRT**: Primary energy resources - non-renewable: total **SM**: Use of secondary material **RSF**: Renewable secondary fuels **NRSF**: Non-renewable secondary fuels **FW**: Net use of fresh water

Waste flows

Indicator	Unit	A1-3	A4	C1	C2	C3	C4	D
HWD	kg	1.79e-01	2.72e-03	2.18e-04	1.13e-04	3.89e-01	1.70e-05	1.04e-02
NHWD	kg	4.22e+00	4.88e-02	2.87e-02	2.26e-03	4.66e-01	3.90e-04	-4.47e-01
RWD	kg	4.28e-05	4.54e-07	3.09e-07	2.34e-08	1.99e-05	2.38e-09	9.81e-07

HWD: Hazardous waste disposed **NHWD**: Non hazardous waste disposed **RWD**: Radioactive waste disposed

Output flows

Indicator	Unit	A1-3	A4	C1	C2	C3	C4	D
CRU	kg	0	0	0	0	0	0	0
MFR	kg	7.68e-02	0	0	0	9.00e-01	0	0
MER	kg	0	0	0	0	0	0	0
EEE	MJ	8.70e-03	0	0	0	0	0	0
EET	MJ	1.78e-02	0	0	0	0	0	0

CRU: Components for re-use **MFR**: Materials for recycling **MER**: Materials for energy recovery **EEE**: Exported electrical energy **EET**: Exported thermal energy

Name	Value	Unit
Biogenic carbon content in product	0	kg C
Biogenic carbon content in accompanying packaging	4.17e-03	kg C

Additional requirements

Greenhouse gas emissions from the use of electricity in the manufacturing phase

Electricity consumption in the manufacturing phase is composed from the source below certified by Guarantee of Origin. Electricity is represented by data in ecoinvent 3.10 regionalised for Germany.

Electricity	Unit	Value
Hydro	kg CO_2-eq. / kWh	0.72

Dangerous substances

The product contains no hazardous substances given by the REACH Candidate List or the Norwegian Priority List.

Additional environmental information

Additional environmental impact indicators required in NPCR Part A for construction products

Indicator	Unit	A1-3	A4	C1	C2	C3	C4	D
GWP-IOBC	kg CO_2-eq.	1.43e+00	1.39e-01	8.11e-03	5.18e-03	3.28e-01	6.26e-04	-1.57e-01

GWP-IOBC: Global Warming Potential - Instantaneous oxidation of biogenic carbon

Bibliography

DIN EN ISO 14025:2011-10	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
DIN EN ISO 14040:2021-02	Environmental management - Life cycle assessment - Principles and framework
DIN EN ISO 14044:2021-02	Environmental management - Life cycle assessment - Requirements and guidelines
EN 15804:2012+A2:2019	Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
DIN CENTR 15941:2010-11	Sustainability of construction works - Environmental product declarations - Methodology for selection and use of generic data
DIN EN 15942:2022-04	Sustainability of construction works - Environmental product declarations - Communication format business-to-business
ISO 21930:2017-07	Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services
ecoinvent v3.10	ecoinvent, Zurich, Switzerland, database version 3.10
PCR	NPCR 013 Part B for Steel and Aluminium Construction Products
	Basic principles and recommendations for describing the dismantling, post use, and disposal stage of construction products: https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2020-07-06_texte_130-2020_guidance-document-construction-industry.pdf
	ILCD Handbook: https://eplca.jrc.ec.europa.eu/uploads/ILCD-Handbook-LCIA-Background-analysis-online-12March2010.pdf

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